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VOLUME XXXII

1918

209563
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Quarterly Supplement of Anesthesia and Analgesia

[American Journal of Anesthesia and Analgesia]

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THE SURGERY PUBLISHING CO.

92 WILLIAM STREET

NEW YORK, U. S. A.

AMERICAN

JOURNAL OF SURGERY



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AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

JANUARY, 1918.

No. 1.

THE APPLICATION OF THE PHYSIOLOGICAL PRINCIPLE TO TENDON

TRANSPLANTATIONS.

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It is a surprising fact that despite the hundreds of tendon transplantations performed each year certain anatomical and physiological facts essential to their rational execution have received little or no attention. For instance, one of the most important requisites for a successful operation is that the transplanted tendon shall glide freely, yet the laws governing the gliding mechanism of tendons have not been investigated. Again, in suturing a tendon, the surgeon should naturally attempt to restore the normal tension, yet, until recently, no one had attempted to discover what the normal tension is. Search the text-books of physiology and scarcely a word will be found about tendons, yet they are mechanically as important as the bones or muscles about which thick chapters have been written. In the medical literature, too, tendons have been slighted. Heinecke, Hartmann, Lovell and Tanner, Lunghetti, and Seemann, have helped to elucidate their anatomy, but no one, so far as I have discovered, published anything about their physiology until Stoffel, in 1914, presented a paper before the German Orthopedic Association dealing with the tension of tendons. His conclusions were of peculiar interest to me since, despite the difference between his method of investigation and mine, our results agreed accurately.

I first became interested in tendons in 1912 when, during a service under Prof. Lange in Munich, I began studying them with Dr. Carl Henze of New Haven. Prof. Lange gave us as the specific research problem the prevention of post-operative adhesions. In a series of animal experiments, we tested successively various substances,—vaseline, Cargile membrane, etc., in their effect upon adhesions. Finally we followed the suggestion of Biesalski and utilized the sheath of one tendon as the pathway for the transplanted tendon. This method gave such excellent results that I decided to follow up the physiological principle involved, namely, the coordination of the operative technic with the normal anatomy and physiology. To do this, how-

ever, extensive research was a necessary preliminary.

The first question I attempted to answer was, "how do tendons glide?" I found that the tendon sheath was merely one element in the gliding mechanism, and that the range of motion of the tendon above its sheath was fully as great as within the sheath. The sheath acted merely as a fluid buffer so situated as to lessen friction when the tendon turned a corner. Only those tendons were provided with sheaths whose course was marked at some point by a change of direction. The Achilles tendon, for example, possesses no true sheath, despite frequent references to such a structure in the surgical literature, and the term, "tendo-vaginitis," when applied to the Achilles tendon, is a misnomer. The Achilles tendon pursues practically a straight course and is surrounded by a fascial envelope simulating a sheath, but differing from it radically in structure, since the tendon sheath, like a joint, is characterized by a synovial-lined cavity containing a serous fluid. The motion of the tendon, where a sheath is not present, is made possible by a loose areolar tissue, the paratenon, rich in elastic fibers, which possesses sufficient elasticity to permit 4 to 8 cm. of motion without tearing. Within the sheath this tissue is continuous with a membrane of similar structure, known as the mesotenon, through which the tendons derive their vascular supply. It is self-evident that at the upper and lower portal of the sheath a definite mechanism must be present which closes off its cavity and at the same time allows the tendon to move to and fro. The tendon may roughly be compared in this connection with the piston of a steam engine whose cylinder is analogous to the sheath. The essential difference between the engine and the tendon mechanism is that there is no connection between the piston and the cylinder, whereas the sheath is directly attached to the tendon at its entry and at its exit. Study on the cadaver, observation during operations on human beings, and animal experiments, reveal the presence of a delicate fold of loose connective tissue prolonged downward as a kind of tongue into the sheath. This structure (the plica), by virtue of its elasticity, can follow the movements of the tendon and at the same time wall off the cavity of the sheath. In many instances it shows a kind of in-

...during the phase of muscular contraction...
...the changes in the form of this structure were studied, I may quote one experiment. Under anesthesia the tibialis anticus of a dog was stimulated with a faradic current, and while the muscles' cells were in a condition of maximal contraction, the limb was plunged into formaline and kept there until the muscles, still stimulated by the faradic current, had become fixed. On the opposite leg the gastrocnemius was faradized in similar fashion so as to produce a relaxation of the tibialis anticus. Thus, on

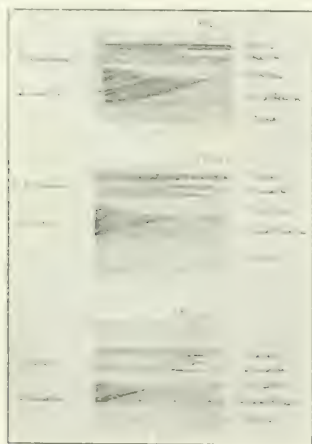


Fig. 1. Changes in the form of the sheath during contraction of the muscle.
A. The upper pole of the sheath when the muscle is completely relaxed.
B. The muscle has partly contracted. Note that the two poles of the sheath are beginning to approach.
C. The muscle has reached the maximal contraction. Note that the deep pocket of the sheath between the tendon and the plica has formed.
D. The muscle is relaxed. Note that the wall of the tendon sheath accommodates itself to the motion of the tendon by numerous folds of the synovial membrane.

one side the tendon was drawn upward by the contraction of the anterior tibial muscle, on the other side downward by its opponent. The sheath and tendon were then excised, hardened in formaline, and serial sections were prepared. By comparison of corresponding sections during the phases of muscular contraction and relaxation, the mechanism of the sheath and the related structures could be determined. (See Fig. 2.) All observations on the gliding of tendons illustrated the importance of the loose connective tissue surrounding them, which must therefore be treated with the greatest respect in all operations.

As a result of this first portion of the research it was possible to formulate certain operative rules

which, when tested clinically, verified the experimental deductions. First, the operator should, wherever possible, utilize the sheath of the paralyzed tendon as a pathway for the transplanted tendon, since the sheath has a distinct purpose to serve for which it is peculiarly adapted. Assume that the tibialis anticus muscle is paralyzed and that the extensor hallucis proprius is to be transplanted in its stead. The tibial tendon is equipped with a sheath to prevent friction against the crucial ligament of the ankle. It is therefore a rational physiological procedure to make the substituting extensor hallucis tendon pursue a similar course. The technic for the procedure is exceedingly simple as soon as the operator knows the anatomy of the structures involved. In its neatness of execution and in its application of physiological principles to surgical technic it must appeal to the surgeon far more than the crude method of boring a subcutaneous channel now generally in vogue.

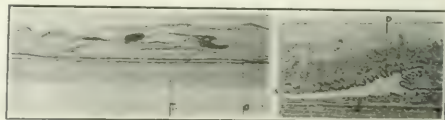


Fig. 2. The lower pole of the tibialis anticus sheath of a dog.
A. During the phase of muscular relaxation.
B. During the phase of maximal contraction.
T.—tendon.
D.—lower pole of the sheath.
P.—the plica.
Note that during contraction of the muscle the tendon, in gliding, is surrounded by the wall of the tendon sheath which accommodates itself to the motion of the tendon by numerous folds of the synovial membrane.

A second lesson derived from the study of the gliding mechanism of tendons concerns the course of the tendon from its original site to the sheath of the paralyzed tendon. If normally the tendon throughout its course is invested with loose gliding tissue, then when transplanted, the operator must see to it that similar conditions are maintained. In the instance above cited of the transfer of the extensor hallucis proprius for the tibialis anticus this rule has no particular significance, since the two tendons lie next to each other, separated only by a partition which at one point is so thin as to be transparent. This is, of course, the site of election for the transfer. In the operative transfer of the peroneus longus for the tibialis anticus, however, the principle is of great significance, since these two tendons lie in distinct fascial compartments separated from one another by a dense septum. To bore a hole through this septum would be contrary to the physiological principle and would almost to a certainty give rise to adhesions which would prevent gliding of the tendon. According to the new technic, the difficulty can be avoided. The

deep surface of the fascial compartment is coated with areolar tissue, the paratenon, adapted to the gliding of the tendon. By cutting a kind of trap door (Fig. 3) in the fascia, flaps can be reflected in such a way as to expose this deep surface and utilize it as a bed for the transplanted peroneal tendon. For the details of the operation the reader is referred to the monograph "Die Physiologische Sehnen Verpflanzung, Biesalski and Mayer (Paul Hoeber, New York)" or to *Surgery, Gynecology and Obstetrics*, March, 1916.

Despite adherence to these two rules the tendon operation will probably not be successful if the post-operative period of immobilization is continued too

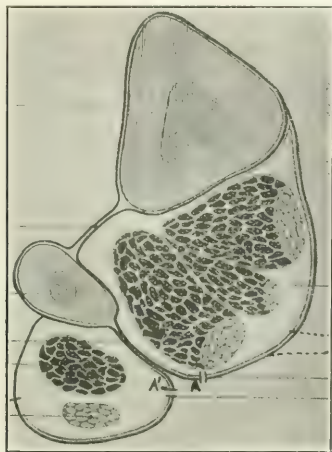


Fig. III. Diagrammatic cross section of the calf showing the anterior and lateral muscular compartments, and illustrating the principle of the fascial plastic by which the peroneus longus tendon can be transferred from its compartment to the anterior.

long, since the trauma incidental to an operation, however carefully performed, causes slight adhesions which with time will become sufficiently strong to hinder gliding. It is therefore necessary to begin early function of the transplanted tendon so as to stretch these adhesions while they are still friable. How can this be done without tearing away the tendon from its new point of insertion? Here again anatomical and physiological study gave the key to the situation. The operator must try to imitate the normal insertion of the tendon. He must not prolong the tendon silk or catgut, nor should he, except in unusual instances, attach it to another tendon. He must implant it directly into the bone in such a way that its fibers will become moored to the osseous structure. This can be done by traumatizing the periosteum and implanting the tendon between it and the bone. (See Fig. 4.)

To hold the tendon securely in this position a special fixation suture was devised. (Fig 5.) This suture can withstand double the traction which the muscle can exert. It gives mechanical security until the physiological security gained by the implantation into the bone has occurred. That this actually occurred was conclusively shown in eight animal experiments, and in five secondary operations. In all instances, even when the transplanted muscle was exercised on the third day subsequent to the operation, the tendon remained firmly anchored.



Fig. IV. Diagram illustrating the physiological method of anchoring the transplanted tendon to the bone.

- A. The paralyzed tendon.
- B. The transplanted tendon.
- C. The traumatized periosteum.
- D. Bone.
- E. Fixation suture.
- F. Tendon sutures.

In practice a two or three weeks' period of immobilization was found to give the best results. In case the patient is too young to exercise the muscle voluntarily, it should be stimulated by the electric current. Early exercise of the transplanted tendon does not imply straining it. On the contrary, it must be carefully guarded by a splint or brace for at least one year, or until it is strong enough to assume the function of the paralyzed muscle.

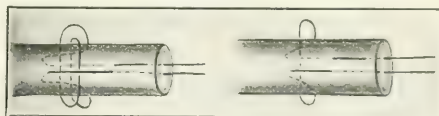
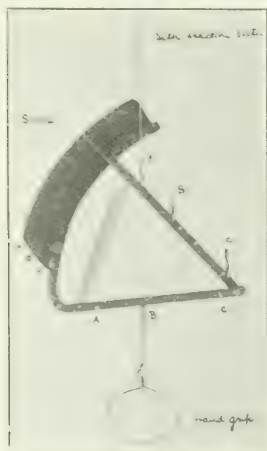


Fig. V. The fixation suture.

- A. The single stitch.
- B. The double stitch.

The second important physiological problem associated with tendons which I attempted to answer was the determination of their tension. It is clear that the tendon, in transmitting the traction of the contracting muscle to the skeleton, acts in much the same way as the rope of a derrick and must therefore be under a certain degree of tension. To determine how great this is I performed the following experiment on dogs: Under anesthesia a tendon was exposed and divided two centimeters above its insertion. The upper or proximal end was then threaded with stout silk able to stand a traction of ten kilos and the ends of the silk were attached

to the hook of a spring balance (Fig. 6) which registers the tension from 25 grams to 1000 like a mechanical spring. When placed in the proximal stump until it had been drawn down to the distal. Under the varying conditions of muscular contraction and relaxation the tension necessary to approximate the two tendon ends could then be read off. When the muscle was made to contract by electrical stimulation, the degree of tension varied according to the size of the muscle and the strength of the electrical reaction. When the muscle was at rest, however, the tension was found to be a constant quantity, estimable by the simple formula: With



the extremity so placed that the origin of the muscle and its point of insertion were brought as near together as possible, that is, the position of maximum muscular relaxation, the tension of the tendon was zero. This fact enables the operator to formulate a practical rule: To suture the tendon under normal tension, hold the limb in such a position that the origin of the muscle whose tendon is to be transplanted and the new point of insertion of this tendon are approximated as nearly as possible, and pull upon the tendon with just enough force to render its course a straight one. In the case of the peroneus longus transplanted for the tibialis anticus the foot should be held dorsi-flexed, supinated and adducted, and when in this position the tendon should be sutured to the point of insertion of the tibialis anticus with zero tension. Then the operator can be assured that no undue strain is placed upon the structures involved. Of course

the tendon must not be allowed to pursue a round-arched course, nor should the tension sink below zero by allowing any slack. This would be fully as bad a mistake as sewing under too great tension.

By applying the physiological principle to tendon transplantations a method has been devised by means of which the transplanted tendon can glide freely, is firmly anchored at its new point of insertion, and is sutured under normal tension. Knowledge of the vascular supply of tendons, of the level and thickness of fascial planes, of the exact length of the individual tendons, enables the operator to perfect his technic to a nicety. The indications for tendon transplantations require an accurate knowledge of muscular action and the proper selection of cases calls for a keen critical sense. If more than three tendons of the foot are paralyzed a tendon transplantation is seldom indicated. Then the surgeon must have recourse to other measures such as arthrodesis or astragalectomy. If the indications are carefully followed, and the operations carefully performed, the results are extremely satisfactory. In over 250 cases I observed in only one instance post-operative adhesions, and they were due to a direct violation of the physiological principle. In all other cases the transplanted tendon glided with almost the normal freedom and accurately assumed the function of the paralyzed muscle.

SUBSCAPULAR BURSITIS.

A common source of errors in diagnosis, and consequent treatment, are the inflammatory conditions in the bursæ located around the shoulder girdle, causing cervical and shoulder pain. This pain is often radiated down the arm and treated for neuritis or rheumatism. Subscapular bursitis is found in the round shoulder type in both the well nourished and the thin. The scapulæ have grown too curved during childhood from the forward position of the shoulders and are often bent enough, so that the superior angle is hooked forward. This rubs back and forth over the chest wall, producing more or less thickening of the bursa. Under occupational strain, infection, or toxic irritation, the bursa becomes inflamed and is made worse by all movements of the shoulder. To elicit the painful spots, stand behind the patient, place your hands over the shoulders with thumbs pressed over the upper, inner angles of the scapulæ. Have the patient shrug the shoulders up and down, and forward and backward; a decided crepitation is felt and pressure at this point will often elicit extreme tenderness and pain.—*C. L. LOWMAN in Medicine and Surgery.*

THE PREVENTION OF POSTANESTHETIC ACIDOSIS.*

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Surgical technic is rapidly becoming standardized. Practically all of our operating surgeons are now following closely along the same lines and vary their technic only in minor details. The great leaders in operative surgery have demonstrated in their large and varied clinics the best way of performing the standard operations in order to secure the most perfect results. While there will continually be improvements and refinements in the details of surgical technic, it is not in the realm of technic that we should look for great advances in a few years.

It is in hospital efficiency, the preoperative and postoperative care of patients, safety in anesthesia and prevention of shock, that we may expect to see marked improvements in the near future.

The modern hospital has passed through a slow evolution from an improvised structure with ignorant and inefficient attendants to a carefully planned and scientifically equipped institution with well-trained nurses.

It is a fact, however, that there are still too many hospitals that are really nothing more nor less than hotels with nurses of various degrees of training as attendants and a staff of physicians who pop in and out as a part of their daily rounds in a busy general practice.

How often have we seen, even in some of our largest cities, surgical cases entered in the hospital, rushed through a mere form of an examination, operated on and sent back to bed and left to the mercy of a cadet nurse and a recently graduated house physician. Too often does the interest of the surgeon end at the operating table. There is a certain fascination about operative work that attracts and holds the interest of the majority of physicians, but the study of preoperative and postoperative conditions is rather a humdrum ordeal.

Nevertheless it is the careful, painstaking diagnosis, preoperative treatment and postoperative care that determine the end-results just as much, if not more, than the actual technic used in the operation.

In the modern rush of business there is a great tendency to do superficial work; quality is being sacrificed for quantity, and the same is true in medicine. We so often try to do so much that we can't do any of our work as we know it really should be done, for the price of perfect end-results in surgery is the constant, painstaking study of our cases.

In very many elective operations, if the patient can be at the hospital for a few days prior to the operation, much can be done to reduce the operative risk and insure a smooth convalescence.

Many patients come to the hospital who have been greatly weakened and their vital resistance lowered by malnutrition due to gastric or intestinal ulcer; by hemorrhage due to uterine fibroids, bleeding piles, etc., by fever due to malaria or some focal infection or by long-continued pain. Then, too, if we add to the handicap of weakness and low vitality, the fear that is almost always, to some extent at least, felt by a patient entering a hospital, there is little wonder that surgical shock is common in some institutions. If these patients could have proper preoperative treatment they could be improved both physically and mentally, and it would change their prospects very materially.

Profound anesthesia is about as near death as one cares to get; the period of recovery from this state and the first few days following a major operation, when a hundred and one complications of varying degrees of severity may arise, requires the attention of a master and not a tyro. The day has passed when an anesthetic should be given by anyone without special training.

The mooted question of the nurse anesthetist is far from settled, and while in our work we employ both a physician and a nurse to give their entire attention to the administration of the anesthetic, it seems to us that a nurse who has had special training in this particular field ought to be able to give a safer, smoother anesthetic than the family physician who has had no special training or practice.

The best end-results in surgery will be obtained by the man who has absolute control of the department in the hospital at which he works and who spends much time at the hospital studying his cases and devising ways and means of preventing even minor complications and of making more comfortable and complete, the convalescence of his patients.

During the past six years we have been paying special attention, in our hospital work at Kerrville, to pre and postoperative treatment, and have found that there are many little things that can be done that will make the patient's stay at the hospital more pleasant and insure better end-results. It is one of these little things to which we desire to direct your attention for a few moments to-night.

Every surgeon of experience has learned to instinctively estimate the qualities of each operative case and to make a mental note of the risk. We all know that the better the condition of the patient the better will be the risk. A patient who is poorly

*Read before the Bexar County Medical Society, San Antonio, Texas, June 14, 1917.

nourished or who has been underfed for some time will not have the vital resistance that the well nourished full-fed patient will have. Such a patient would be much more subject to shock and more liable to show the toxic effect of the anesthetic.

There are many patients whose nutrition prior to entering the hospital has been neglected and who, on account of vomiting, are without food for some time following the operation. These cases also are more subject to delayed shock and a prolonged convalescence.

Starvation adds to the acidity of the organism, which Crile says acts as a direct injury to the cells of the nervous system. Acid intoxication is found to occur to some extent after about fifty per cent. of anesthetics. This acid intoxication or acidosis, as it is called, is a condition and not a definite pathological process, the characteristic features of which are excretion of acetone bodies in urine and breath and a marked increase in the tritribile acids in the urine. There is a great decrease in available alkalies which, when extreme, may cause coma and death.

The two distinct causes of acidosis, starvation and anesthesia, when occurring at the same time in the same patient, may produce such a degree of toxicity as to become alarming or even fatal. The minor degrees of acidosis are responsible for many cases of persistent postoperative vomiting.

In 1914, Crile and Alford published a paper in the *Journal of the American Medical Association* which gave the results of animal experiments conducted by them to determine the effect of diet upon animals poisoned by chloroform.

Three sets of white rats were taken, one set was fed for six days on oats and glucose, another on meat, and the third on fat, and at the end of that time each animal was given, hypodermatically, what was presumably the minimum fatal dose of chloroform. The experiments seemed to show quite conclusively that carbohydrates protect the body proteins from disintegration.

Many surgeons have, for some time, made a routine practice of giving soda and glucose solutions by mouth before operation, and per rectum during operation or in form of the Murphy drip following the operation. We have used these methods and believe that the excellent clinical results which have been reported are fully justified.

In the light of all the evidence available, however, it seems probable that the administration of alkalies only relieves the symptoms of acidosis, but it requires the absorption and oxidation of carbohydrates to prevent the excessive katabolism of fats and proteids.

In cases where mouth feeding is not contraindicated, carbohydrates should be administered as a routine to within three hours of beginning the anesthetic. Solutions of glucose are best suited for this purpose as they are readily absorbed and are not liable to cause intestinal fermentation.

There are, however, many surgical cases in which mouth feeding cannot be carried out for sometime prior to operation. For these cases it is of the greatest importance to know that glucose solution may be given either intravenously, subcutaneously or per rectum with excellent results.

There is at present much evidence to show the superiority of the subcutaneous use of glucose solution, and it seems definitely proven that when used in this manner it supplies energy to the cells, aids in tissue repair and diminishes acidosis.

Only a small percentage (2 to 5 per cent.) of the glucose injected subcutaneously finds its way into the urine. The calorimetric experiments of Veazar and Von Fejer prove that the remainder is burned in the body. As much as three liters representing 200 grams of glucose may be given hypodermatically during 24 hours. A 4% solution in distilled water is isotonic, but a 5% solution is readily taken care of if given slowly.

In studying this matter in the light of the experimental work cited, and in connection with the findings of Kausch in 1911, we decided that if glucose solution was good before and after the operation it would probably be better during the administration of the anesthetic when the sugar was most needed in the blood to neutralize the toxic effect of the anesthetic. Hence we began using a 5% glucose solution by hypodermatoclysis during the operation, about $\frac{1}{2}$ liter being put under each breast or into the loose tissues of the axilla. If given slowly with strict aseptic precautions, it will produce no more discomfort than normal salt solution given in the same manner.

We still use the pre and postoperative administration of glucose and soda but give the solution subcutaneously in addition, for we have demonstrated to our entire satisfaction the superiority of the results obtained by the subcutaneous method when administered during the anesthesia.

We have used this procedure as a routine for the past four years, using it in practically every major operation and are thoroughly convinced that the clinical results are excellent; in fact, aside from the lessened thirst, minimized nausea and absence of acidosis, we believe that in many weak, poorly nourished subjects of low vitality, it is actually life saving, and the most effective preventative of surgical shock yet devised.

EVOLUTION IN SURGICAL PRACTICE.

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In 1890 a leading metropolitan surgeon was called to trephine the skull, where a diagnosis of fracture and compression was made. The operation failed to confirm the diagnosis. The patient was a so-called moderate drinker, using spirits at meals daily. He was very active up to the time of the injury. The surgeon recommended alcohol as a stimulant to be given with great regularity and increased if the heart failed. Two physicians were in attendance, and the use of spirits together with other stimulants was kept up in increasing doses until his death, ten days later. The autopsy presented negative evidence concerning the cause of death. In 1916 an equally active man was thrown from a motor, striking on his head, producing contusions, and he was supposed to be suffering from fracture of the skull. An eminent New York surgeon was called to perform an operation. He declined, but ordered that all spirits should be withdrawn from the patient, who was a moderate drinker, and small doses of sulphate of magnesia, with active hydropathic measures, should be given. The family physician refused to take responsibility and the surgeon assumed it, sending a student from his office to carry out his directions. The patient recovered and became a total abstainer.

In a brown-stone mansion on Fifth Avenue a patient with a crushed knee-joint and fracture of both tibia and fibula was considered by the best surgeons as a fit case for amputation. This was done with skill and the failing heart was treated with brandy at short intervals. The most elaborate nursing and skillful therapeutic measures failed to prevent gangrene and death in a very short time. Last year a patient at his summer home sustained a severe fracture of the knee-joint and the femur. Two eminent surgeons replaced the fragments in the best antiseptic conditions and placed the patient under a tent near his summer home. He, too, was a moderate drinker. All spirits were withdrawn, the diet was restricted and hydrotherapeutic measures substituted. The best hygienic conditions were applied and in three months full recovery followed. The patient is attending to business with simply a stiff knee-joint. Cases like the following were common in the best circles of scientific medicine a few years ago. Obscure disorders of the stomach with anemia were treated with excessive feeding and the most nutritious foods, together with stimulants to sustain the heart, the mortality was always exces-

sive, notwithstanding the most scientific nursing and care. Later many of these cases were treated by surgical explorations to determine the presence of tumors or other obstructions. Great emphasis was given to the study of the heart's action and stimulants were supposed to be the principal remedy. No matter what the original causes were, anemia and exhaustion seemed to call for scientific feeding, and elaborate food theories of what was essential were entertained and practised. Today in these obscure cases, wherever there is an alcoholic causation, or the history of drug taking, with or without the advice of the physician, the modern surgeon refuses to do anything until all stimulants and drugs are withdrawn, then if the patient has been a gourmand his starvation diet is called for. Surgeons find that the mortality following operations in any condition of life is greatly lessened when the patient is an abstainer from spirits and drugs. Operations must be carried on in pauper hospitals and elsewhere, without the attention to the possible habits of the patient, and yet the results are uncertain and doubtful when the patient's condition cannot be controlled.

A leading surgeon said to a wealthy patient, "The risk of a fatal operation is at least twenty per cent. greater than it would be if you would go home, give up all use of spirits and attend to careful dieting for a month." The patient was astonished, but followed the surgeon's advice. The era of excessive feeding with elaborate diets and combinations of spirits and milk has gone by. The modern surgeon, no matter what his diagnosis may be, always recognizes these obstacles and removes them if possible, before he attempts surgical interference. A very wealthy man endowed an elaborate hospital in Syria with a palatial building and every possible appliance for the most modern surgical work. A few years later he paid a visit to the hospital and found that the work was done outside under tents and trees, there were hardly any beds occupied in the hospital, the building was literally a chapel and meeting-room for those who were convalescing. The surgeons declared that the mortality in this building was high compared with the work done outside in the open air. This was the result of experience and not of theories. The surgeons found that antiseptic work and restricted diet with water as the chief remedy were followed by the most satisfactory recovery.

The surgical experience in France and Belgium bring out this fact in a most revolutionary way; amputations are growing less and less; even for surgical lesions, contused bones are adjusted, and the treatment conducted with especial reference to pre-

vent infection and to encourage healing. In plastic surgery of the face American physicians have astonished the European surgeons by their brilliant results. The text-books concerning the treatment of wounds written a few years ago are rapidly being superseded by new methods and the use of new means unrecognized before. In hemorrhage, particularly of the brain and internal organs, no spirits are used, but morphia in small doses is found to contribute the most practical means for recovery. The modern surgeon in private practice and even in hospitals is rapidly learning the essentials of recovery in the conditions, habits and surroundings of the patient. The routine work of a few years ago, with its fears of collapse, fears from intercurrent diseases of exposure and many real or imaginary causes is receding, and the American surgeon from all others is rapidly learning the great facts that his art is only an aid to nature and that a great variety of other causes, than that he is called to remove must be recognized. He is also learning how far the mind of the patient influences the progress or suppression of the disease, and how essential conditions of toxemias, anemias and other conditions must be considered in the problem of cure.

TECHNIQUE OF WIRING CORRESPONDING TEETH OF SUPERIOR AND INFERIOR MAXILLA IN FRACTURE OF INFERIOR MAXILLA.

EDMUND BUTLER, M. D.

SAN FRANCISCO

The diagnosis should be confirmed by radiographs as a double fracture is sometimes present unsuspected.

Have the patient on an ordinary warm dressing or operating table of medium height so that access may be had from all directions.

The mouth is cleansed by irrigating with a weak peroxide of hydrogen solution followed by sterile water. Clots of food may be loosened with a wooden applicator mounted with cotton. Any attempt to brush or scrape the teeth will cause the patient great discomfort and is not warranted.

If the patient is excitable and not easily controlled anesthesia is required. Gas-and-oxygen is preferable but must be administered by an expert anesthetist. Ether by the open drop method is satisfactory if an expert anesthetist familiar with gas-and-oxygen cannot be had. When anesthesia is used be certain that the stomach contains no food before fixing the teeth. The vomiting of mucus and bile

with the teeth fixed is not dangerous, but the vomiting of food may be extremely dangerous.

Reduce the fracture, judging the results of your efforts by the occlusion of the teeth. If a tooth is loose in the line of fracture and prevents correction of the position of the fragments, remove it. It is not often that a tooth has to be removed. When the occlusion is correct select the teeth to be wired, usually the first molars on the sound side, the lateral incisors, anterior to the line of fracture and the first sound tooth posterior to the line of fracture, on the fractured side. The jaws are now separated again. If the fracture line is posterior to the teeth in the region of the angle of the jaw, the inclusion of the first molars on both sides is sufficient as the tension of the muscles keep the fragments in position after the body of the jaw is immobilized. When the fracture is double it is often very difficult to select the teeth that tend to maintain correct occlusion, and only individual judgment will map out a correct procedure in these extreme cases.

Six centimeter length of copper wire, No. 26 or smaller, are cut from a spool such as is used by an electrician. The teeth of the superior maxilla are prepared first. The first upper molar is taken, for example. Retract the cheek gently with finger or small Parker retractor, slip the end of the wire through the distal interdental space, with a curved hemostatic clamp direct the wire around the lingual surface and out through the proximal interdental space. Now grasp each end with a clamp and twist the protruding wire ends, the first twist fixing the wire around the body of the tooth, and continue to twist until approximately six twists are made, the remaining twists falling into space distally. If the two ends are grasped in one clamp and twisted the tension from torsion snaps the wire before it clinches on the tooth. The wire must be proximal to the shoulder of the tooth and take the shape of its circumference. If these details are fulfilled the wires do not slip and future adjustments are not needed.

The remaining selected teeth of the superior maxilla and the corresponding teeth of the inferior maxilla are now prepared as described above. Every movement must be profitable when working on the teeth of the inferior maxilla as manipulation is extremely painful. Having the wires in place, force the inferior jaw into position of correct occlusion, twist or hook wires of the corresponding teeth together, cut off superfluous portions, turn the rough ends against the teeth and guard each with dental wax or rubber.

With the jaws fixed in position the patient be-

comes comfortable and any further adjustment, as tightening the wires, is not painful. If the wires are properly applied no adjustment from day to day is necessary. The patient is nourished by crushed, scraped and liquid food forced through a catheter passed posterior to the last molar or through the space of an absent tooth. If unable to use the corresponding teeth, an oblique position of the wires is not detrimental as long as the obliquity is in the direction which prevents the deformity from reforming. The wires may be removed from the fourteenth to the twenty-first day; the longer period is advisable unless their removal is deemed judicious before.

A SIMPLE OPERATION FOR RETROVERSION OF THE UTERUS.

A. N. BESSESEN, M. D.,
MINNEAPOLIS, MINN.

Retroversion of the uterus is a frequent cause of pelvic disorder in women. When found at operation it should be corrected. Otherwise the patient may not obtain the full relief expected, although other seemingly more important defects are attended to.

Too often a mild or even excessive retroversion is left after simply bringing the uterus forward and dropping the intestines into the pelvic cavity. Dr. Edward Oschner claims that even a normal uterus should be held in proper position by a temporary ventral suspension, after a laparotomy. Why, then, is this condition so often allowed to remain? Possibly because no operation yet devised fulfils the requirement. Relapses are so frequent as to be discouraging. More than one hundred methods and variations of methods have been devised to overcome this defect. Some of the operations suggested are so complicated that while otherwise desirable they take so much time and skill that any minor excuse may prevent their performance. Other operations depend on the production of abnormalities that in themselves preclude their more general use. Many of the operations are done on the thickened part of the round ligament near the uterine end and so tend further to weaken the natural support and must necessarily result in a relapse of the retroversion.

The method that I wish to present was worked out by me some three years ago. I have demonstrated it to a number of surgeons and all have so far approved of its logic. In the few cases that I have operated upon and have been able to follow up there has been no relapse of the retroversion.

I find that E. C. Dudley described a somewhat

similar operation in the *American Journal of the Medical Science*, June, 1906. I can therefore claim for my operation only that it is a modification of Dudley's.

Dudley's technic is as follows: "Traction being made on the ligament in order to locate its point of entrance at the internal ring, an ordinary needle is introduced at this point and the round ligament and the adjacent parts of the broad ligament are caught up from point to point until the suture finally is brought out in the uterine tissue near the uterine end of the round ligament. The tying of the suture, which should not be drawn too tightly, shortens and strengthens the ligament by crumpling it on itself. If the ligament is absent or highly attenuated the structure of the broad ligament between the horn of the uterus and the internal ligament may be brought together by a similar suture with similar results. Before tying the suture the surfaces should be scarified in order to secure strong union."

In my modification of Dudley's operation I do not carry the suture to the horn of the uterus, but prefer to start with the needle at a point about one-half to one inch distal to the uterus, passing the needle through the round ligament and then from point to point to its exit at the internal ring, there the needle is made to take a bite through the tissues at the ring, and is returned in like manner to the point of starting. The opposite side is treated in the same way. When the operator draws taut the suture of the one side and an assistant draws taut the suture of the opposite side it is easily determined how much tension will be required to bring the uterus into the corrected or, better, slightly over-corrected position. The sutures are then tied. If desired a shortening of the utero-sacral ligaments can also be performed to give added security.

By this method we avoid the long strand of ligature that must necessarily be exposed when the suture is tied in the Dudley operation. If the two extremes are drawn into opposition we produce not so much a crumpling of the ligament as a bending or doubling of the ligament on itself, in a manner to form an irregular circle, thus practically eliminating the round ligament as a factor in the support of the uterus.

The operation that I suggest retains the strongest part of the ligament to functionate. The thinner outer part is crumpled on itself in such manner that it also is made thicker and of equal strength with the uterine end of the round ligament.

The advantages that I claim for the operation are, in the first place, that it cannot primarily fail. One is perfectly certain of finding the round liga-

ments and of shortening them to any required degree. Second, the uterus is left in its normal position and supported by its round ligaments in a natural way. There are no loops or holes for the intestines to enter and cause trouble. Should pregnancy occur the uterus is left free to move and rise as may be required. By the use of non-absorbent suture material the result is likely to be permanent. The only way failure could happen would be through cutting out of the sutures, and that will not happen if care is taken in tying them. The operation is easy to perform, and can be done quickly, even when a shortening of the utero-sacral ligaments is done at the same time.

This operation is especially advantageous in patients who have not passed the menopause and who are in fairly good physical condition, with tissues sufficiently firm to hold by suture.

I should like to hear from other surgeons their experiences with this procedure.

301 DONALDSON BUILDING.

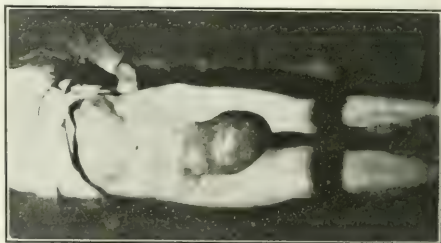
AN UNUSUALLY LARGE SARCOMA OF THE TESTICLE.*

WALTER A. FANSLER, M. D.,
MINNEAPOLIS.

This case is a striking example of the need of public education concerning malignant disease. The public should be told over and over again that any lump or unusual enlargement or discharge should be investigated at once, and that malignant tumors are usually painless in the early stages.

The patient was a male, age fifty, a foreman in a planing mill, family history negative. Ten years ago he was kicked on the right testicle by a horse. The testicle swelled at that time to about twice normal size, but after a few weeks returned to what he considered normal. Since that time the testicle had frequently become tender and a little swollen, but never enough to keep him from work. About one year ago it started to progressively enlarge, and three months ago was the size of his fist. The past three months the growth has been much more rapid, and at the time he presented himself for examination, the size of the mass was 16x17 cm. as measured with a pelvimeter. The accompanying cut shows the relative size. The skin over the mass was tense, red and shining, but was movable. The superficial vessels were dilated. The mass had completely usurped the right of domicile, the penis

showing as a dimple. The tumor was in its greater part hard and firm, but there were several areas that suggested fluid. The scrotal mass was almost round, but a projection could be felt, extending up into the right iliac region, apparently through the abdominal ring. The right leg was twice the size of the left, due to edema. No separate lymph nodes and masses in the abdomen could be palpated. The left testicle was normal in size and easily palpated. The patient said he suffered no pain whatever, and it was simply the size of the mass and the swelling of the leg which prevented anything but limited locomotion that had brought him to the doctor. He said he thought he had a hernia, and was wearing a truss. He was told that the chances of cure were practically *nil*, but he wanted what slight chance there was, and the ability to walk with greater freedom, so the mass was removed as completely as possible. Grossly the tumor mass was found to consist of rather vascular, friable tissue for the most part, which contained cystic and degenerating areas. Microscopically it was found to be a sarcoma of a rapidly growing type as was shown by the many mitotic figures and multiple mitoses.



The wound healed readily and the edema of the right leg lessened very markedly. After operation he was immediately started on graduated treatments with X-rays and Coley's fluid to the point of tolerance. A small tumor mass quickly appeared in the right iliac region and increased in size in spite of these measures, and the patient left the hospital in about five weeks with a considerable mass in the right lower abdomen, but he did not complain of pain at any time. The patient was last seen on December 20th, two months and one week from date of operation, at which time the mass in the abdomen extended to the midline and almost to the umbilicus. The edema of the leg was again marked. He still had practically no pain. We were unable to get further report of him, but of the termination there is no doubt.

100 Andrus Bldg.

*From the Journal of the U. S. A. 1918.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

**SUBSCRIPTION PRICE, ONE DOLLAR.
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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, JANUARY, 1918.

THE DEVELOPMENT OF NEW HOSPITALS.

The functions of health departments vary according to the willingness of the public to meet the costs and according to the degree of public sentiment and knowledge, necessary to properly appreciate the need for the control of health hazards. According to the *Public Health Reports*, December 7th, 1917, the appropriations for health departments in the United States vary almost directly with the size of the community and, in general, are insufficient for the proper functioning of these departments.

The annual per capita expenditure for health averages from nine cents in communities of 5,000 or under to thirty-nine cents in cities of 100,000 or 300,000 population.

At this time when numerous health problems are arising by reason of war time conditions, it is essential that public health administration be advanced as rapidly as possible. The necessity for establishing civil sanitary districts around the National Army cantonments has been recognized. The lack of adequate sanitary, laboratory and hospital facilities for rural health work has been repeatedly emphasized. The value of cooperative efforts to insure the reduction of sickness and death from preventable diseases is more significant during a state of war than during times of peace.

The maintenance of the health of the civil and in-

dustrial population and the restoration of the afflicted promptly to a state of physical wellbeing without the loss of efficiency demand the extension of hospital facilities as rapidly as funds can be made available. In the government plans for the care of disabled returned soldiers, provision is being made for general military hospitals with auxiliary hospitals as required, together with special institutions for the treatment of nervous and mental diseases, diseases of the heart and lungs, and orthopedic defects. The specific need for the proper management and redemption of men injured in military and naval service indicates the importance of similar hospital organization for the great mass of people upon whom the burden of war must fall even though they are not honored by a uniform or title.

The formulation of a definite policy for municipalities deserves consideration while the entire subject of hospital care is under discussion by the highest authorities in the national service.

The time for meagre appropriations, poorly paid, untrained and unskilled health officers has passed. Police and fire protection are appreciated at their full value but the wants of communities along lines designed to secure the physical wellbeing of citizens has not been evaluated according to the returns to the community.

Hospitals are not merely institutions for the care of the sick and for providing facilities for surgeons and technically trained specialists. They represent vast social agencies for the promotion of the economic and social welfare of those who are afflicted but more particularly for the complete advancement of the community. Unfortunately hospitals have been regarded as charities. The idea of charity in hospital care must be relegated to the background and due appreciation must be given to the fact that the hospital represents a constructive systematic attempt of society to afford rightful protection to the members of a community against conditions for which community life is more responsible than the personal shortcomings of individuals.

The therapeutic aspects of surgery merit interpretation in terms of economics. The disabled soldier, whether in military or civil life, possesses a decreased value. The function of the hospital involves the reclamation of patients to the maximum degree of social effectiveness. Hospitals for the care of the tuberculous, the venereally diseased, the orthopedically handicapped, the mentally unbalanced will increase in number in direct proportion to the intelligent understanding of their necessity and economic purpose.

The extent to which modern armies depend upon the cooperation of the medical profession demonstrates advantages to be secured through trained workers. The basis of medical organization is the hospital. The consciousness of the importance of hospital care is slowly dawning upon the body politic. As a result the hospital movement in this country will grow with rapidity. Hospital expansion will be a measure, not of the charity of the nation, but of its knowledge, understanding, and appreciation, of the worth of hospitals as conservers of the human vital assets which disease and accident attempt to sacrifice. I. S. W.

aiding the dependents of soldiers and sailors.

There has recently been organized, in New York City, a committee to look after the medical and surgical needs of soldier's and sailor's dependents. This is distinctly not a charity—as the word is so unfortunately misunderstood—but a method of doing something that it were better if it were not necessary to do. Many of the men who have gone to the front have left their families provided to meet the ordinary contingencies but their necessarily reduced incomes will not stand the strain imposed by a lengthy illness. It is inconceivable to the writer how any physician who for physical or other considerations is unable to offer himself to the government could fail to respond to a call from such a source, willingly and freely. The almost unanimous affirmative answer given by those already approached is sufficient evidence of the sense of duty of the medical profession.

While it is understood that the doctor is the first and, so far as a hasty survey of our economic state shows, practically the only one who gives, and literally the only one who is expected under all circumstances to give other than a moiety of his surplus to his fellow; and while his is an enviable distinction in a hard and materialistic society and one which the writer would not want to relinquish, it would seem, meet at this time that others should join with him. The traditional altruist should not lead the van and be the procession as well. Would it be impossible, for this once for the landlord, the butcher, the baker to give a little too? Of course the time honored—shall we say excuse—will be advanced that what the doctor gives costs him no actual outlay of money. Still the rent of the soldier's or sailor's family could be reduced; his children could be fed at cost or at a reduced profit and a patriotic duty would be done equal to any rate, to that of free handed giving to badly managed—or sadly impoverished funds.—L. G. K.

Book Reviews

Surgical Clinics of Chicago. October, 1917. Vol. 1, No. 5, with 84 illustrations. Philadelphia and London: W. B. SAUNDERS Co., 1917.

This number contains a number of very fine clinical talks. One very unique case is described by Dr. Malcolm L. Harris of the Henrotin Memorial Hospital. In a young girl of fifteen years a swelling developed in one breast which was shown to be due to the escape of the glandular part of the breast into the subcutaneous tissue through a large opening or rather deficiency of the fascia which normally encloses it. The deformity was corrected by circumscribing the opening with a circular suture which was then tightened. A good result is recorded.

Books Received

Elements of Hygiene and Public Health. By CHARLES PORTER, M.D., B.Sc., M.R.C.P. (Edin.), of The Middle Temple, Barrister-at-Law; Medical Officer of Health, Metropolitan Borough of St. Marylebone; Examiner in Public Health, University of Edinburgh; Member of Board of Examiners, Royal Sanitary Institute and Sanitary Inspectors' Examination Board; Author of "Sanitary Law and Practice" (with Dr. William Robertson). Duodecimo; 411 pages; 81 illustrations. London: HENRY FROWDE-HODDER & STOUGHTON, 1917. \$4.15.

Medical Research and Human Welfare. By W. W. KEEN, M.D., LL.D. (Brown), Emeritus Professor of Surgery, Jefferson Medical College, Philadelphia. Duodecimo; 160 pages; illustrated. Boston and New York: HOUGHTON MIFFLIN COMPANY, 1917. \$1.25.

A Text-Book of Bacteriology. By PHILIP HANSON HISS, JR., M.D., Late Professor of Bacteriology, College of Physicians and Surgeons, Columbia University, New York City; and HANS ZINSSER, M.D., Professor of Bacteriology, College of Physicians and Surgeons, Columbia University, New York City, Bacteriologist to the Presbyterian Hospital, Formerly Professor of Bacteriology and Immunity, Stanford University, California. *Third edition.* Small octavo; 769 pages; 155 illustrations. New York and London: D. APPLETON & COMPANY, 1917.

Practical Bacteriology, Blood Work and Animal Parasitology. By E. R. STITT, A.B., Ph.G., M.D., Medical Director, U. S. Navy; Graduate, London School of Tropical Medicine; Professor of Tropical Medicine, Georgetown University; Lecturer in Tropical Medicine, Jefferson Medical College; Formerly Associate Professor of Medical Zoology, University of the Philippines. *Fourth edition.* Duodecimo; 497 pages; illustrated. Philadelphia: P. BLAKISTON'S SON & Co., 1916. \$2.00.

Diseases of Women. By HARRY STURGEON CROSSEN, M.D., F.A.C.S., Associate in Gynecology, Washington University Medical School, and Associate Gynecologist to the Barnes Hospital; Gynecologist to St. Luke's Hospital, Missouri Baptist Sanitarium and St. Louis Mullanphy Hospital. *Fourth Edition.* Large octavo; 1160 pages; 800 illustrations. St. Louis: C. V. MOSBY COMPANY, 1917.

Preventive Medicines and Hygiene. By MILTON J. ROSENAU, Professor of Preventive Medicine and Hygiene, Harvard; Director of the School for Health Officers of Harvard University and the Massachusetts Institute of Technology; formerly Director of the Hygienic Laboratory, U. S. Public Health Service, etc. With chapters upon Sewage and Garbage, by GEORGE

C. WHIPPLE, Professor of Sanitary Engineering, Harvard; Vital Statistics, by JOHN W. TRASK, Assistant Surgeon-General, U. S. Public Health Service; Mental Hygiene, by THOMAS W. SALMON, Medical Director, National Committee for Mental Hygiene, etc. *Third Edition.* Large Octavo; 1374 pages; illustrated. New York and London: D. APPLETON & COMPANY, 1917.

Diagnostic and Therapeutic Technic. A Manual of Practical Procedures in Diagnosis and Treatment. By ALBERT S. MORROW, A.B., M.D., Clinical Professor of Surgery, N. Y. Polyclinic, etc. *Second Edition.* Large octavo; 834 pages; 860 illustrations. Philadelphia and London: W. B. SAUNDERS Co., 1917. \$5.50.

Handbook of Anatomy. By JAMES K. YOUNG, M.D., F.A.C.S., Professor of Orthopedic Surgery, Philadelphia Polyclinic; Orthopedic Surgeon to the Philadelphia General Hospital; Fellow of the College of Physicians, of Philadelphia; Fellow of the Philadelphia Academy of Surgery; Fellow of the American Orthopedic Association, etc. *Fifth Edition.* Duodecimo; 435 pages; 154 illustrations. Philadelphia: F. A. DAVIS COMPANY, 1917. \$2.00.

Surgery and Diseases of the Mouth and Jaws. A Practical Treatise on the Surgery and Diseases of the Mouth and Allied Structures. By VILRAY PAPIN BLAIR, A.M., M.D., F.A.C.S., Professor of Oral Surgery, Washington University Dental School; Associate in Surgery, Washington University Medical School. *Third Edition.* Revised to incorporate the latest war data concerning gunshot injuries of the face and jaws. Compiled by the Section of Surgery of the Head, Subsection of Plastic and Oral Surgery, Office of the Surgeon General of the Army. Octavo; 733 pages; 460 illustrations. St. Louis: C. V. MOSBY Co., 1917. \$6.00.

Physical Diagnosis. By W. D. ROSE, M.D., Lecturer on Physical Diagnosis and Associate Professor of Medicine in the Medical Department of the University of Arkansas. Octavo; 499 pages; 294 illustrations. St. Louis: C. V. MOSBY Co., 1917. \$4.00.

Chirurgie de Duerre. Chirurgie D'Urgence. Chirurgie Déparatrice et Orthopédique. Par LE DR. MAUCLAIRE, Chirurgien de la Charité. Professeur agrégé à la Faculté de Médecine de Paris. Chirurgien-chef de plusieurs ambulances. Octavo; 532 pages; 316 figures. Paris: LIBRAIRIE J. B. BAILLIÈRE ET FILS, 1918.

A Dietary Computer. By AMY ELIZABETH POPE, Formerly Instructor in the School of Nursing, Presbyterian Hospital; Instructor in the School of Nursing, St. Luke's Hospital, San Francisco, Cal. Author of "A Medical Dictionary for Nurses," and, with Anna C. Maxwell, of "Practical Nursing." Duodecimo; 170 pages. New York and London: G. P. PUTNAM'S SONS, 1917.

Talks on Obstetrics. By RAE THORNTON LA VAKE, M.D., Instructor in Obstetrics and Gynecology, University of Minnesota; Associate Attending Obstetrician and Gynecologist to the Minneapolis City Hospital; Obstetrician-in-Charge of the Out-Patient Obstetric Department of the Wells Memorial Dispensary; Obstetrician to the Swedish and Abbott Hospitals, Minneapolis; One Time Assistant Resident Obstetrician to the Sloane Hospital for Women in New York. Duodecimo 157 pages. St. Louis: C. V. MOSBY Co., 1917. \$1.00.

The Treatment of Emergencies. By HURLEY R. OWENS, M.D., Surgeon to the Philadelphia General Hospital; Assistant Surgeon to the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases; Chief Surgeon to the Philadelphia Police and Fire Bureaus; Assistant Surgeon, Medical Reserve Corps, U. S. Navy. 350 pages; 249 illustrations. Philadelphia and

London: W. B. SAUNDERS COMPANY, 1917. Cloth, \$2.00, net.

Physiological Chemistry. By C. J. V. PETTIBONE, Ph.D., Assistant Professor of Physiological Chemistry, Medical School, University of Minnesota, Minneapolis. Duodecimo; 328 pages. St. Louis: C. V. MOSBY Co., 1917. \$2.50.

Food Preparedness for the United States. By CHARLES O'BRIEN. Duodecimo; 118 pages. Boston: LITTLE, BROWN & COMPANY, 1917.

Physical Exercises for Invalids and Convalescents. By EDWARD H. OCHSNER, B.S., M.D., F.A.C.S., President, Illinois State Charities Commission; Attending Surgeon, Augustana Hospital, Chicago. Duodecimo; 54 pages; 40 illustrations. St. Louis: C. V. MOSBY COMPANY, 1917.

A Handbook of Antiseptics. By HENRY DRYSDALE DAKIN, D.Sc., F.I.C., F.R.S., and EDWARD KELLOGG DUNHAM, M.D., Emeritus Professor of Pathology, University and Bellevue Hospital Medical College; Major, Medical Officers Reserve Corps, U. S. Army. Duodecimo; 128 pages. New York: THE MACMILLAN COMPANY, 1917. \$1.25.

Progress in Surgery

A Résumé of Recent Literature.

Wounds of the Knee-Joint. SIR BERKELEY MOYNIHAN, Leeds. *Boston Medical and Surgical Journal*, November 22, 1917.

1. In all cases of wounds of the knee-joint, the limb should be fixed immovably upon a splint at the earliest possible moment, and until circumstances and surroundings permit of a complete operation.

2. At the casualty clearing station, or other operating center, an x-ray examination is made in all cases. The whole limb is then prepared for operation.

3. The following are the essential features in all operations; excision of the wounds and of the track of the projectile after preliminary sterilization by the cautery, or otherwise; a free exposure of the joint either by enlarging existing incisions or by long internal or external incisions or by the formation of a flap by division of the patellar ligament.

4. All foreign bodies must be removed from the joint. Even the smallest piece of clothing or of metal may be the nidus of a continuing infection.

5. The wounds are closed in layers by catgut sutures. Drainage is secured by leaving a gap in the line of suture of the synovial membrane, or by leaving a tube close "down to but not into" the joint.

6. Drainage tubes are never placed within the joint cavity. They do not drain the joint, they are harmful in their effects upon the delicate synovial membrane, and they are often a channel by means of which infection is conducted to the joint.

7. In cases of severe infection of the joint by staphylococcus, or especially by the streptococcus, the wounds must be reopened, the synovial membrane stitched to the skin, free drainage of the joint secured, and the Carrel-Dakin or other method of progressive sterilization of the wound adopted. In more severe cases, with an infection rapidly gaining ground, excision of the joint may be necessary.

8. In cases of severe comminution of the articular ends with much loss of substance (the whole of one condyle, for example), a resection of the joint is performed forthwith.

9. In severe and extensive wounds with heavy infection, the method of resection with wide, temporary separation of the ends of the bones (Fullerton) should be practiced.

10. In cases of very extensive damage, especially with infection amputation is desirable.

Subperiosteal Fissure Fractures of the Tibia in Children.

S. KLEINBERG, *Journal of Orthopaedic Surgery*, November, 1917.

The chief characteristics of this type of fracture are as follows: (1) It occurs in children. (2) It involves only the tibia. (3) There is moderate swelling of the leg. (4) There is a definite linear tenderness. (5) There is persistent linear tenderness. (6) Discoloration is very circumscribed and is often absent. (7) It results probably from a twist of the leg. (8) It runs the ordinary course and heals in 4 to 6 weeks. (9) From the facts available it is thought to be periosteal. (10) It looks like and is most often mistaken for a contusion.

A Method for Efficient Drainage of the Knee-Joint.

A. W. MASON-KOENIG, *British Medical Journal*, October 6, 1917.

With the limb in the usual dorsal position, the deepest part of the synovial cavity is in front of the popliteal space, much below the level of the suprapatellar pouch. Drainage is at present practically always effected by inserting a tube or tubes into the pouch above the patella, leaving much of the septic contents of the joint behind and between the femur and tibia with a tendency to make a way for itself to the surface by burrowing backwards into the popliteal space or along the course of the tendons in that region, upwards into the thigh, and downwards into the leg, or in both directions.

By changing the position of the limb, it is possible to make a suprapatellar pouch the dependent part of the joint, when by the very simple operation of inserting a tube into the top of the pouch the whole joint can be completely evacuated and purified, and if this is done sufficiently early, a speedy recovery may be anticipated with the joints mobility unimpaired.

Two changes of position will make the suprapatellar pouch dependent:

- (a) The vertical position of the limb at right angles to the body with the patient in the dorsal decubitus, or
- (b) The prone position of the body with the foot of the bed well raised.

In both positions the limb must be efficiently fixed on a splint, as fixation in inflammation of the knee-joint is only second in importance to drainage.

When once the joint has been thoroughly evacuated of its septic contents, and if needful gently washed out with warm normal saline solution, the synovial membrane of the knee, like the peritoneum, is capable of taking care of itself. Long-continued drainage is very seldom required, and usually a movable joint will be obtained.

Screw Fixation in Joint Fractures. ASTLEY P. C. ASH-HURST, Philadelphia. *Medicine and Surgery*, October, 1917.

The author reports his experience with Lambotte's method of screw fixation of the fragments in joint fractures which are not susceptible to bloodless methods of fixation. The results have been excellent. The screws never gave any trouble.

The Rectangular Flap Incision for Operations Within the Upper Abdomen. WILLY MEYER, New York. *Journal of the American Medical Association*, November 17, 1917.

The transverse incision has the advantage of making it mainly through the fascia and the more natural tendency to closure of the wound. It has the disadvantage, however, of making it more difficult when the transverse incision alone is employed to expose all the organs that are desired. The writer has found a turn downward of the right extremity of the incision within the rectus muscle useful in upper abdominal operations. There are two methods of this exposure. The first is the method of Koenig and Kehr by which the incision goes through all the tissues of the abdominal wall, turning them up in the form of a rectangular flap, and the second is the method of Perthes, who makes a rectangular skin muscle flap including skin and subcutaneous fat plus the anterior sheath of the rectus muscle and a portion of its belly in the line of the skin incision. Meanwhile the transversalis muscle and the

transversalis fascia with a posterior sheath of the rectus which is, in part at least, made up by the united aponeuroses of the transversalis muscle and posterior lamella of the aponeurosis of the oblique—plus peritoneum, are incised in the oblique direction parallel to and in front of the costal arch. This preserves intact the intercostal nerves which supply the muscle substance of the rectus. The advantages of each procedure are given in detail and the writer's personal experience is described. He has employed the Koenig-Kehr through-and-through cut on three different occasions. In two cases, at least, it was made necessary by an accident or by conditions making the other method impracticable. The typical Perthes' incision has been done in twenty-two cases. In one case choledocholithotomy with subsequent hepatic drainage had to be carried out, and in two it was employed as a useful entrance for exploration with added appendectomy. Once a subhepatic abscess, consecutive to a duodenal ulcer, was found. While this experience is not very extensive, it has convinced the writer of the advantages of the rectangular methods, which represent a valuable addition to our operative resources. The surgeon will act wisely if he becomes thoroughly acquainted with all methods that have been found to be of value and are adapted to certain conditions.

Obscure Tarsal and Malleolus Fractures. WILLIAM PEARCE COVES, Boston. *Medicine and Surgery*, October, 1917.

Tarsal and other injuries about the ankle are frequently obscure and when there is a question of confusion from rare anatomical variants it is necessary to take radiographs of the uninjured foot as well. Careful clinical examination and a definite diagnosis should be attempted before radiographs are taken. The clinical signs that usually make the surgeon suspicious are usually well marked. Treating these fractures as sprains may cause later deformity, pain and weakness of the foot and excessive callus, as pointed out by Ross and Stewart. Subperiosteal and "sprain-fractures" of the external malleolus are quite often treated as sprained ankles.

Role de la Plicature Intestinale dans Les Lésions Chroniques du Colon Ascendant et de l'Ampeule Cæcale. (The role of intestinal plication in chronic lesions of the ascending colon and of the cecal pouch.) Dr. G. A. CASALIS DE PURY. *Paris Medicale*, October 27, 1917.

The anatomy, pathology and pathogenesis of the condition which in England and America is usually called Jackson's veils or Lane's kinks is described and the method of surgical treatment made use of by the author is indicated. This includes the liberation of the adhesions found by appropriate incisions, an appendicectomy and a plication of the ascending colon along a line parallel with the longitudinal striæ. The results were very interesting and gave the author great satisfaction.

A Statistical Study of the Causes of Abortion. G. D. ROYSTON, *American Journal of Obstetrics*, October, 1917.

Royston studied in detail 164 patients who had a history of abortion, out of a total of 563 patients examined. He found in his study that more than 20 per cent, probably over 25 per cent of all abortions are induced. Sixty per cent of all induced abortions result in more or less permanent sterility. Dangers resulting from induced abortion are worst in the case of the midwife, next the patient and last by the physician. A positive Wasserman reaction is obtainable in about 25 per cent of all women who have aborted. Less than one-third of the syphilitic women give any history or show any physical signs indicative of the disease. This is most apt to be detected by routine Wasserman examination. Syphilis interrupts pregnancy at any and all periods of gestation. Syphilitic women abort in more than 60 per cent of their pregnancies. Renal deficiency interrupts pregnancy only in the event of renal decompensation as evidenced by definite concomitant symptoms. Pregnancy may be interrupted as a result of renal insufficiency at any period of gestation. 65 to 90 per cent of all women who have aborted will show some pathologic lesion in the genitalia.

A Case of Double Obliquely Contracted Pelvis (Roberts), Associated With Acute Lumbar Lordosis Due to an Infantile Paralysis in Early Childhood. E. M. LAZARD, *American Journal of Obstetrics*, October, 1917.

This was a negress thirty-nine years old, principara at time when first seen by Lazard. The patient had evidently had infantile paralysis at the age of six since when she was not able to stand erect but walked on all fours. The patient had been in hard labor for seven hours. A highly contracted pelvis with a decided inclination was rapidly discovered by examination. A Caesarian section resulted in the birth of a live child. The uterus was removed because of the presence of numerous fibroids. The patient made a good recovery.

A Study of Chloroform, Ether and Nitrous Oxid-Oxygen in Pregnancy and Labor. C. HENRY DAVIS, *American Journal of Obstetrics*, October, 1917.

After comparing the toxic effects of chloroform, ether and nitrous oxid upon mother and fetus, Davis concludes that in the hands of most obstetricians, nitrous oxid-oxygen has proved itself the most valuable analgesic for labor. This is particularly true of the painful second stage of labor when ether is less satisfactory but more desirable than chloroform. For early in labor, the author uses, if an analgesic is required, either an opiate alone or with chloral hydrate or scopolamin.

Nitrous-Oxid Analgesia in Obstetrics: A Study of 476 Cases. W. C. DANFORTH, *American Journal of Obstetrics*, October, 1917.

Danforth's general conclusion is that his experience has been for the great part satisfactory in the use of nitrous oxid analgesia in obstetrics. It may, however, not be used for a period exceeding three hours. It should be given at the beginning of each pain, not uninterruptedly. But the gas should be started immediately at the onset of a pain. Good results cannot be obtained if the pain is allowed to get well under way before inhalation is started. Cyanosis must and can be avoided. If the baby is born cyanotic allow the mother to inhale pure oxygen for a few breaths before tying the cord. The technic of administration of the gas must be mastered for ideal results to be obtained.

The Differential Diagnosis of Right Renal and Gall-bladder Lithiasis. LEWIS GREGORY COLE, *Interstate Medical Journal*, October, 1917.

In differentiating between these two kinds of calculi the following criteria are of help:

1. The shadow of a renal stone is much smaller and more clearly defined with the plate posterior and the tube anterior. When the position of plate and tube is reversed, a biliary calculus is smaller and more clearly defined.
2. Stereoscopically renal calculi appear in a posterior plane near the vertebral column, while biliary stones appear in an anterior plane above or below the costal arch.
3. If two plates are made with a lateral shift of the tube between the two, altered relations between the stone and the kidney of gall-bladder shadow may readily make a differentiation possible.
4. A plate made with the patient on his right side will show gall-stones in an anterior and renal stones in a posterior plane.
5. The proximity of the stones to the anterior or posterior walls can be shown by any of the standard methods of foreign body localization.
6. Pylegraphy or ureteral catheterization serve as accurate methods for renal localization; gastrography for gall-bladder localization.

The Fourth Venereal Disease—Erosive and Gangrenous Balanitis. ROBERT G. OWEN, and FLOYD A. MARTIN, *The Journal of Laboratory and Clinical Medicine*, September, 1917.

Corbus was the first to draw attention to this very typical infection. He believed the condition to be quite common, and conceived the disease to be a distinct clinical entity. Bacteriologically, smears from the

discharge shows fusiform bacilli or vibrios or spirochete forms; these are Gram-positive and have no motility. The organism is a strict anaerobe.

Symptomatology: The disease usually begins as small superficial erosions on the penis. These may heal within a few days, or may coalesce. The characteristic symptom of this type of venereal sore is the early and profuse yellow pus of foul odor. The lymph nodes are enlarged and painless. As a rule, there are no constitutional symptoms. As the disease is caused by an anaerobe, it is best to expose the sore to air. Hydrogen peroxide acts as a specific. For the gangrenous type, salvarsan may be necessary.

The Significance of Tubercle Bacilli in the Urine.

WILLIAM M. SPITZER, WILLIAM WHITEIDGE WILLIAMS, WARD BURDICK and J. P. CRANEY, Denver. *Interstate Medical Journal*, October, 1917.

The following conclusions seem justifiable to the authors: Tubercle bacilli in the urine in a tuberculous patient indicate a tuberculous lesion somewhere in the genito-urinary tract and the patient should be kept under observation until the exact location is found. Since an early diagnosis is of the greatest importance it is advised that urinary sediment of all tuberculous patients be injected into guinea-pigs as a matter of routine. The distressing symptoms due to bladder infection can be prevented by an early diagnosis of tuberculosis of the kidneys, preferably made before the bladder becomes involved. This is possible by the methods outlined in the paper.

Goiter. An Analysis of 125 Cases with a Note on the Treatment. LEIGH F. WATSON, Chicago. *N. Y. Medical Journal*, September 22, 1917.

Watson reviews the records of 125 goiter cases considering the cause, age at onset, and effect of previous operations in certain cases. He illustrates by tables the degree of enlargement, and reports the results following quinin and urea injection.

In 43 per cent. no exciting cause could be elicited; in the remaining 57 per cent. the onset could be ascribed to a definite exciting cause. Of the 125 cases, 15 per cent. was caused by worry; parturition was responsible for 11 per cent., and in 9 per cent. the condition was due to puberty. Twenty per cent. gave a family history of goiter and 11 per cent. of nervousness; 19 per cent. had had tonsillitis. Forty-five per cent. of the exophthalmic patients first noted the goiter eight years before examination at the average age of 34 years, and the symptoms developed at the age of 40. Fifty per cent. gave a history of acute onset, two years before coming under observation at the average age of 29 years. Sixty per cent. of the non-exophthalmic patients observed that they developed more marked symptoms of intoxication as the goiter became more chronic.

Before coming under treatment, five exophthalmic patients had had ligation of the superior thyroid arteries with temporary relief; four had had partial thyroidectomies without permanent benefit; three had had pelvic operations without lessening the hyperthyroidism; the condition of one was aggravated by a panhysterectomy; and one had had a tonsillectomy six months before without influencing the severity of the exophthalmic symptoms. Enlargement usually begins in the right lobe, sometimes in the isthmus and least frequently in the left lobe. In 95 per cent. of the exophthalmic patients of this group both lobes and isthmus were involved before the goiter became exophthalmic. A majority of the patients noticed increasing symptoms of intoxication as the goiter became more chronic, gradually involving both lobes and isthmus. Eighteen per cent. of the mildly toxic patients became exophthalmic after an average period of five years. This study indicates that both non-toxic and toxic goiter occur later in life in nongoitrous localities than in sections where the disease is more prevalent.

The following tables show the results after quinin and urea injections:

Effect of the Injection of Symptoms.	Relieved.	Improved.	Not Imp.
Exophthalmic	85 (aver. 4 mos.)	15	0
Nonexophthalmic	84 (aver. 2 mos.)	10	6

Effect of the Injection

	Cured	Reduced	Not Red
Exophthalmic	86 (aver. 5 mos.)	15	5
Nonthyroidal	75 (aver. 4 mos.)	12	13

Two patients suffering with severe toxic goiter with exophthalmos of several years duration received only slight benefit; later a lobectomy was performed without additional relief. Four exophthalmic patients were pregnant two to four months. Relief from hyperthyroidism followed the injection and they went to term without recurrence and had normal deliveries. The number of patients cured is highest in the group of those who came for treatment early in the disease; the benefit received by those who came later was in proportion to the degree of damage done the circulatory and nervous systems. A goiter that once disappeared has never recurred. A majority of the patients in this group have been under observation for two to four years. The quinin and urea injection has limitations the same as any other treatment for goiter and can be employed only in selected cases. The treatment of the exophthalmic type in young adults is very difficult, and should be attempted only under the most favorable circumstances. If the best results are to be secured hyperthyroidal patients must have at least a year of mental and physical rest after treatment.

The Prevention of Simple Goiter in Man. DAVID MARINE and O. P. KIMBALL. *The Journal of Laboratory and Clinical Medicine*, October, 1917.

Marine and Kimball state that simple goiter in animals is probably the easiest of all known diseases to prevent and that small doses of iodine protect animals against compensatory hyperplasia of the thyroid. Therefore, in a large group of school girls they administered iodine in exceedingly small doses. Out of 3,872 girls examined for thyroid enlargement only 43.59 per cent. were normal, thus indicating the great incidence of thyroid changes occurring in school girls at puberty. To offset the possibility of thyrotoxic symptoms appearing in these children, the authors gave sodium iodide, 2 to 4 gms., over a period of a few weeks, administering 0.2 gms. daily. The treatment is given twice a year, in May and December.

The Clinical Symptoms and Treatment of Hypertrophy of the Thyroid Gland. CHARLES GREENE CUMISTON. *Canadian Thoracic Journal*, August 22, 1917.

The clinical signs are of two kinds, (1) functional, frequent paroxysms of suffocation, and (2) the physical signs including the radioscopic. Three distinct surgical methods have been essayed, viz., exothyroidectomy, resection of the sternal anubrium and thymectomy. Thymectomy is unquestionably the operation of choice and in order to avoid injury to the large vessels, pericardium or pleura, an intracapsular enucleation should be done. Partial thymectomy has been enough in many cases to cause the symptoms to subside. Sufficient experience has not been acquired along radiotherapeutic lines to enable one to speak with certainty of this method of treatment.

Post-Transfusion Reactions. A Review of 280 transfusions performed in Presbyterian Hospital, New York City. H. E. MELEYEV, W. S. STEARNS, S. T. FORTUNE and R. M. TERRY. *New York American Journal of Medical Science*, November, 1917.

1. Transfusion is of real value in cases of hemorrhage, in clean operative cases, in pernicious anemia, and in some secondary anemias. It is of little or no value in septic operative cases, cases of bacteremia, or cases of acute leukemia.

2. The sodium citrate method of transfusion is a very simple and satisfactory method. A dilution of citrate up to 0.5 per cent. in 1000 c.c. of blood can be used without producing toxic symptoms in an adult, and that dilution prevents clotting better than a dilution of 0.2 per cent.

3. Blood grouping should always be carried out before a transfusion. Where a reliable laboratory is at hand the direct grouping of donor and recipient is not necessary, but otherwise should always be performed. Failure to determine the compatibility of the bloods may result in the sudden death of the patient.

4. Post-transfusion reactions occurred in 63.6 per cent. of the cases in our series, the reactions varying greatly in degree, but all being evidenced by a rise of temperature to 100° or more.

5. The recipient in good general condition is much more likely to have a reaction than the one in poor condition.

6. The method of transfusion, the blood relationship of donor and recipient, and the blood group of the recipient seem to have nothing to do with the occurrence of the reaction.

7. Transfusions of small amounts of blood, i. e., less than 200 c. c., are less likely to be followed by reactions than are transfusions of larger amounts.

8. The more transfusions a patient is given the more likely he is to have a reaction, especially if the same donor is used a large number of times. The blood of some donors is more likely to cause reactions than the blood of others.

9. In some cases the post-transfusion reaction is accompanied by a marked polymorphonuclear leukocytosis. Whether this is due to intravascular hemolysis or to the formation of a toxic product from the partial splitting of a foreign protein cannot at present be stated. It seems most likely, however, that one of these phenomena is probably responsible for most post-transfusion reactions.

Complications of Mastoiditis. D. H. BALLON. *The Canadian Medical Association Journal*, September, 1917.

The author treats briefly the intracranial complications that may follow otitic inflammations. These are (1) Extradural abscess. This is usually produced in virulent infections when the mastoid has but a thin plate of bone separating it from the cranium. Another form of the same condition is termed (2) Perisinus abscess. This in turn may be a precursor of (3) Lateral sinus thrombosis or (4) Brain abscess, which is usually, single, and confined most frequently in the temporoparietal lobe. (5) Cerebellar abscess. (6) Otitic meningitis. (7) Circumscribed labyrinthitis. (8) Cholesteatoma. (9) Otitic facial paralysis.

Ballon takes up the symptoms in each of these complications, points out the details of differential diagnosis and indicates the treatment.

Sinusitis as a Source of Systemic Infection. ALEXANDER S. ROCHESTER, Chicago. *International Journal of Surgery*, September, 1917.

The sinuses are one of the three most common seats for the establishment of foci of infection, the other two locations being the tonsils and gums. Of these three the sinuses are much less frequently the offender. The different types of sinusitis are acute and chronic catarrhal sinusitis and acute and chronic suppurative sinusitis. The last named is the form which gives rise to systemic infection and toxæmia.

Studies in Meningitis. A. LEVINSON, Chicago. *Illinois Medical Journal*, October, 1917.

Pneumococcus meningitis is not rare and usually follows middle ear infection. The exudate is mainly fibrinous and the cellular content of the fluid is mainly polymorphous leukocytes. The pneumococci are more numerous in smears than meningococci in meningococcus meningitis. The prognosis is usually fatal. The treatment should include repeated intraspinal injections of antimeingococcus or normal horse serum.

Electricite Medicale et Reeducation Professionnelle (Medical electricity and professional re-education). Dr. J. LARAT et Dr. A. BILLIARD. *Paris Medicale*, October 27, 1917.

The essential point brought out is that in the centers in France in which the wounded soldiers are cared for the re-education of disabled limbs or muscular groups is not carried out blindly. The cases are studied individually before being referred for mechano-therapy and it is possible to tell with considerable accuracy how much return to normal function can be expected. The most valuable aid both for diagnostic and therapeutic purposes is the electric current.

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA & ANALGESIA

[American Journal of Anesthesia and Analgesia]

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EDITOR

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JANUARY

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THE OPEN METHOD OF ETHERIZATION*

ISABELLA C. HERR, M. D.

CHICAGO, ILL.

The most helpful aids to the advancement of our work as anesthetists are the critical analysis of errors and the investigation and discussion of the reasons for post-operative complications and fatalities during narcosis. That anesthetic accidents during and following narcosis are in a large measure avoidable cannot be gainsaid. Many are due to lack of training, carelessness or to over-confidence in the safety of the agent being administered. The last group agree with Shakespeare in feeling that there is "No danger in what show of death it makes." However, those who are not observant or attentive to detail, although properly trained, will never make first class anesthetists either from the viewpoint of the patient's welfare or the surgeon's comfort.

Complications during anesthesia may be classified under two heads, (1) improper selection of the anesthetic agent and (2) faulty administration. It is not always easy to determine the proper share of blame which should be attributed to the surgical procedures in the post-operative complications, but this does not hold true in case of death during operation. Fatalities during anesthesia, when the patients are not moribund on entering the operating room, are due to improper selection or administration of the anesthetic, to a central respiratory or cardio-vascular paralysis produced by a toxic dose of the anesthetic agent or agents (combined anesthesia) to cerebral hemorrhage in patients suffering from sclerotic arteries with high blood pressure, or accidental hemorrhage during the operation. Death due to operative procedures other than hemorrhage occurs after the patient is returned to bed.

Fleming,¹ in a review of inquests held in England, shows that out of 700 deaths occurring during anesthesia, 521 were due to the anesthetic. Of these patients 223 died before the operation was begun. His statistics are interesting and instructive.

Chloroform	378
Ether	28
C. E., A. C. E., and A. C.	100
Nitrous oxide	12
Ethyl chlorid	6
Scopolamin	2
Hedonal	2
Local	6
Total	186

In analysing these figures one is at once impressed by the dominance of fatalities under chloroform and

it is difficult not to attribute them to the improper selection of the anesthetic agent, although the inexperience of the administrators may have been a contributing factor. Flenning is undoubtedly correct in his belief that this appalling death rate would not have occurred if ether had been administered instead of chloroform. From a purely scientific point of view these statistics serve to show the great need of reform in the selection and administration of anesthetics.

Too much credit cannot be given to the laboratory workers, that army of men and women who study for weeks or months on a single problem to prove or disprove a theory, to erase or put on a firmer foundation practices in medicine or surgery. Few, if any, representative surgeons or internists would be willing to-day to attempt a diagnosis, much less to institute a line of treatment, without the aid from the pathological, bacteriological and X-ray laboratories. The work of these medical allies cannot be ignored by the anesthetist if he would advance the science of anesthesia. However, it must not be forgotten that laboratory workers lack clinical experience and therefore their deductions are not always reliable. For example, to ascertain the real facts and expose the utter fallacy of recent published statements² with reference to the open method of etherization there is necessary only a very little clinical experience, a very little observation unbiased and unprejudiced to prove that the picture described is so foreign to the actual condition of the patient that it is impossible to harmonize the two. However, it is quite incomprehensible how ether can act so differently when given by two people using the same method of administration and the same brand of ether. Is it the gun or the man behind it which controls the situation?

Let us for a moment consider the introduction of ether into the body by other channels than the respiratory system.

ETHER-OIL COLONIC ANESTHESIA.

The ether-oil colonic anesthesia has many advantages over the ether-vapor rectal anesthesia. Upon superficial observation the method is so simple that it has attracted the unwary. Upon close inspection, however, it is at once evident that it has not only distinct limitations but also distinct disadvantages. Adults are given one ounce of a 70 per cent. solution (6 oz. of ether and 2 oz. of olive oil) for every twenty pounds of body weight; that is, a man weighing 140 pounds would be given seven ounces. Children are given a 50 per cent. solution. The personal equation enters so largely in drug susceptibility that it would appear hazardous to attempt

*Read before the American Society of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917. Chairman's Address.

to figure the dosage on the basis of body weight and age. Not to have the anesthetic under immediate control in case of untoward accident, as for example in sudden severe hemorrhage, is a distinct disadvantage which the merest tyro will recognize. We are told that if at any time the patient shows signs of a too profound anesthesia a portion of the mixture should be withdrawn. While this in itself is a simple procedure the disorder occasioned by such a necessity during a major operation must be considered. What assurance have we that the injected solution will remain in the rectum, especially if the operative requirements place the patient in the Trendelenburg position? Is it not possible that the solution had already passed into the colon and caecum in the reported cases of respiratory depression? If such is true the futility of an effort to quickly recover it through lavage is evident. Inasmuch as the ether is excreted by the lungs, if respiratory depression develops less ether is eliminated, while at the same time it continues to be absorbed from the rectal solution which in turn still further depresses respiration. Another objection to the method is the inability to regulate the depth of narcosis to suit the operative requirements during the different stages of the operation.

Reports³ indicate that occasionally rectal irritation, which may prove quite distressing, or end in death, follow this method of etherization.

INTRAVENOUS ANESTHESIA.

Ether is soluble in normal salt solution to the extent of 10.8 per cent. by volume. At first a 10 per cent. solution was injected (2 oz. of ether to a pint of saline). It was found that this concentration produced a transient hemoglobinuria. Test tube experiments of a 5 per cent. solution (1 oz. to a pint of saline) mixed with blood showed no laking. A count of red cells taken at intervals during operation showed no hemolysis. Later experiments indicated that a 7 per cent. solution was equally free from risk. The advocates of the intravenous method of etherization contend that by thus introducing ether directly into the circulation a smaller amount is required to induce and maintain anesthesia. In comparing the amount to that used in inhalation and insufflation the fact that a considerable quantity is lost through evaporation and waste in the latter methods should not be lost sight of. It has been shown experimentally that a certain ratio between the blood and ether must be maintained or the degree of narcosis will vary. As the amount of circulating fluid is increased by the saline in the anesthetic so the amount of ether must be increased to the proportion that the saline bears

to the original volume of blood to maintain the same degree of narcosis. If the amount of circulating fluid present is constant the depth of narcosis is influenced by the percentage of ether administered. It is claimed that this method is of special advantage in patients who are likely to be benefited by saline infusion either because of hemorrhage, shock or low vitality.

Coburn⁴ concludes: "That in the normal individual about eight ounces of saline are required for induction of anesthesia and consequently at the end of induction there is about 5 per cent. more ether in the system than is required in other methods; at the end of an hour of surgical anesthesia the excess is 15 per cent. At the end of a long operation the excess would be more than doubled." It is readily conceivable that a larger amount of ether may be administered than is actually required to maintain anesthesia, although within the limits of safety. Whether the surplus is in the vessels or tissues it must be eliminated. The late toxic effects may thus be increased. Aside from these objections there appears to be more bleeding and some danger of pulmonary edema. The method will never become popular because of the somewhat complicated technic required in its administration. There is great danger of septic thrombosis unless administered under perfect asepsis.

OPEN ETHER.

The *Open Method* of etherization was originated and developed by Dr. Lawrence H. Prince in 1893. At that time he gave a description of the method and reported two series of administrations each containing five hundred patients. The essayist had the good fortune and privilege of being associated with Dr. Prince during his investigations and in 1898 reported her first thousand administrations. As a student and interne and later as an anesthetist she had had ample opportunity of seeing not only the discomfort of the patients during the induction period but the post-operative complications which could be traced to the ether narcosis. It is not surprising then that a method of anesthesia which eliminated the disadvantages of the one in use was hailed with delight and immediately adopted. After a very large experience I can say now in all truth that I have reason "for the faith that is in me." The superiority of the method is evidenced by its steady growth in popularity.

According to the statistics of the Committee on Anesthesia of the American Medical Association more than half of the ether anesthetics administered from 1905 to 1912 were by the open method. This method of administration does not preclude se-

quence or combined anesthesia if desired, nor does it mean that the anesthetic cannot be selected to suit individual requirements. Furthermore, the simplicity of the method should not argue against its efficiency.

USE OF OPEN ETHER.

The manner in which ether is administered during the induction of narcosis spells comfort or discomfort for the patient and makes for his future attitude toward anesthesia. Ether may be given as a sequence to nitrous oxid and oxygen which doubtless is the most agreeable method for the patient. However, many hospitals are not equipped with an apparatus for the administration of nitrous oxid and oxygen, consequently a method which gives the greatest amount of comfort to the patient and at the same time is safe is most desirable. Ethyl chlorid and ethyl bromid may be given in place of the nitrous oxid and oxygen. They possess the advantage over nitrous oxid and oxygen in that they are more easily carried about and require no special apparatus for their administration, but the mortality attendant upon their use is so high that few anesthetists care to assume the extra risk of administering them.

Preparation of the field of operation during the induction of anesthesia serves a double purpose: it shortens the length of narcosis and helps to divert the mind of the patient from the anesthetic. The confidence and cooperation of young children as well as adults can be readily secured if a moment is taken to explain what you are going to do and why you are doing it. Make the patient feel that you are not unmindful or careless of his anxieties and you will be more than repaid by seeing him relax his muscles, smile and not infrequently say: "All right, I'll do anything you say if you will promise to stay with me throughout the operation."

Before beginning the anesthetic the patient is told to breathe naturally, not to force his respiration, and while the mask is held away from the face the ether is slowly dropped on various points of the cover. As the patient becomes accustomed to the odor the mask is gradually lowered till it rests on the face. The rate of dropping is now increased until the entire cone cover is moist. In a few minutes a piece of gauze is placed around the cone or the cone may rest on a gauze ring pad which encircles the nose and mouth, to shut out the air which passes under it, thus all the air which the patient receives is more or less impregnated with ether vapor. When the cone cover is too thick, as, for example, when two layers of stockinet and ten or twenty layers of gauze are used, the method ceases

to be open and may be termed the semi-closed method. With the latter technic more ether is required to moisten the cover, and the patient's exhalations to a considerable degree are retained within the cone and are reinhaled. The oxygen supply is thereby greatly diminished, the effect of which is shown by more or less cyanosis. Two layers of fine, closely woven stockinet or its equivalent in gauze is all that should cover the mask. Stockinet makes a better evaporating surface than gauze. If the cover is too thin it is difficult or impossible to induce and maintain anesthesia. The ether should be dropped continually on the cone. If the dropping is suspended till signs of returning consciousness appear an uneven narcosis results. Intermittent administration has the further disadvantage or danger of administering a too concentrated vapor in one's haste to get the patient *under* again. It should be remembered that a concentrated vapor will do more injury to lung epithelium in a few minutes than a dilute vapor will do during a long anesthesia. It has been shown that a 6 or 7 per cent. vapor is the greatest concentration which can be inhaled without irritation to the air passages. The depth of narcosis is controlled by the amount of ether dropped on the cone and can be varied to suit the operative requirements. To have the cone more than saturated is a waste of ether, as it runs off the cover. When the proper technic of the open method of etherization is carried out, narcosis develops along the lines of natural sleep and it is a rare exception not to have a smooth anesthesia with relaxed muscles and perfect oxygenation throughout the most difficult operation. Contrary to the teachings of some anesthetists, we have no hesitancy in saying that, barring operations which call for insufflation (intraparyngeal, intratracheal) anesthesia, the open method is suitable for any patient or any operation in which ether is the anesthetic of choice. We have employed this method of anesthesia with equally good results at all ages ranging from thirty-six hours (spina bifida) to ninety-six years (carcinoma of the face) and in all conditions of health from the marasmic infant to the athlete, from the frail patient suffering with severe heart lesions to the obese alcoholic. From observation of the work of other anesthetists and as an instructor we have found that trouble during induction and maintenance has invariably been due to faulty technic and not to the open method of etherization.

It is a mistake to think that this method is *foolproof*. An overdose of ether can be easily given, although the danger is not so great as when

less air is allowed as in the rebreathing or closed methods.

ADVANTAGES OF OPEN ETHER.

The superiority of the open method of etherization does not rest upon faith but upon demonstrated facts. One of the greatest, if not the greatest advantage which this method possesses is the large amount of oxygen which the patient constantly receives. This fact is readily determined by observing the ears, face and color of the blood. There is not an intermitting pink and duskiess as when the rebreathing method is used, but the blood oxygenation is constant and normal throughout the narcosis. It therefore naturally follows that the toxic effects are lessened and this has been shown to be the case. Gatch's⁵ studies lead him to the conclusion that: "The severity of the pulmonary lesions found after experimental etherization by the closed method can be satisfactorily accounted for by the great concentration of the ether vapor and the greater liability to aspirate mouth contents when these are used." Dresser⁶ found that: "The ether vapor within the closed mask sometimes reached a concentration as high as thirty-four per cent. while 6 or 7 per cent. is the strongest concentration which can be inhaled without irritation to the air passages." He regards any concentration of vapor which cannot be inhaled by a conscious patient without coughing as harmful to the lung epithelium. Poppert⁷ likewise concluded from his experiments that the greater the ether concentration the more irritating to the lungs. Offergeld⁸ studied the pathological changes in the lungs which occurred after an etherization lasting from seventy to eighty minutes. His results were obtained in guinea-pigs, rabbits and cats after using the closed method, a mixture of ether and oxygen and by the open method. The animals which did not die were killed at various periods after the narcosis. With the closed anesthesia some of the animals died in a few days from bronchopneumonia. Some were killed in two or three days and their lungs showed patches of bronchopneumonia, fatty degeneration and desquamation of bronchial epithelium and hemorrhage into the alveoli. None of the animals that were given ether and oxygen died. If killed at the end of the first day, patches of consolidation with some blood and desquamation of epithelium were present in the bronchi. With the open method there were no deaths. Two days after the anesthesia, necropsy showed a perfectly normal condition of the lungs. When the closed method was used it required four days for the mildest cases to repair. The difference in anesthesia as maintained by the open and closed methods is quite apparent. When an asphyxial fac-

tor is introduced the accessory muscles of respiration assist in the effort to obtain a sufficient supply of oxygen. The result is labored breathing with more or less heaving abdominal movements. The presence of anoxemia is evident by the congestion of the venous system as shown by the bluish color of the ears, lips, cheeks and blood. The respiratory tract is especially affected by the general venous engorgement which increases the size of the tongue and surrounding structures and thus a mechanical obstruction is produced which is further aggravated by the increased flow of mucus. Closed ether administration is particularly unsuitable for florid, stout persons, who become alarmingly cyanosed when subjected to air limitation. When an abundance of air or oxygen is allowed there is no congestion of the capillary vessels and consequently there is little oozing of venous blood from the wound. The pulse is of good volume and blood pressure is well maintained.

FALL IN TEMPERATURE.

In a series of patients anesthetized by the open method we found the temperature (rectal) following operations lasting thirty-five minutes or more, averaged a fall in the male patients of 0.67 F. and in the females 0.27 F. The patients upon whom these observations were made were well covered, as is our custom, during the operations, the parts to be operated upon alone being exposed. Davis and McCarthy⁹ in a recent publication call attention to the fall in temperature during natural sleep. The observations were made upon children who were without fever and without ailments which might cause variations in temperature. The rectal temperature was taken just after the child had fallen asleep and again after an interval of two hours without waking the child. The fall during two hours sleep was 0.9 F. in the males and 0.41 in the females. Why the fall is so much greater in the males than in the females in both series we are unable to explain. It will be observed that the fall during natural sleep is twice as great as that during narcosis and as these authors suggest it is possible that the decrease in body temperature during etherization is analogous to that occurring in natural sleep.

WARMED ETHER VAPOR.

That there is any virtue in warming ether vapor to body temperature is questioned by such able observers as Sellig,¹⁰ Meltzer,¹¹ Cotton and Boothby,¹² Bevan,¹³ McCarthy⁹ and Davis and others. However, inasmuch as it is considered of value by some anesthetists an investigation was instituted to determine the temperature of the vapor within the cone at the point of inhalation.

It was so arranged that it did not come in contact with the patient's face. It was found that the average temperature was about 87.6 F., that is, relatively near body temperature. McCarthy and Davis⁹ have shown that, "A further increase of heat is gained by the time the mixture has reached the pharynx, so that the entire warming process is accomplished before the anesthetic enters the respiratory tract proper." The space within the cone to some extent forms a mixing chamber for the vaporized ether and air. This space also allows a slight degree of rebreathing, the amount of which depends upon the thickness of the cone cover. It naturally follows that the thinner the cover the less rebreathing there will be and the more oxygen the patient will receive. We have found that in vaporizing ether for intrapharyngeal insufflation that there is an advantage in warming the liquid ether; not because of any value in warm vapor but because when air is forced over or through liquid ether the warm ether vaporizes more readily and consequently less air is required to carry the same amount of ether.

SELECTION OF ETHER BLEND DURING ANESTHESIA.

Of much greater importance than warming the ether vapor is the conservation of body heat during anesthesia.¹⁴ Vierdort¹⁵ gives eleven calories per hour as the normal elimination of heat by the lungs, and ninety calories by the skin. When these figures are contrasted, the necessity of preventing the loss of heat by the skin through radiation, evaporation and conduction is apparent. The loss of heat can be prevented by covering, or even raised above normal if the patient is surrounded by hot bottles.

A word regarding ether may not be amiss. Any ether which forms *snow* on the cork or wick when left standing or which freezes on the cone cover during administration should be discarded as being unsuitable for the open method of anesthesia. With such an ether it is difficult, often impossible, to maintain an even, smooth anesthesia and, furthermore, a much larger quantity is required which offsets the difference in price.

CONCLUSIONS

1. When ether alone is administered the induction of narcosis by the open method of etherization is comparatively comfortable.
2. With the open method of etherization, the blood is well oxygenated throughout the narcosis and the patient leaves the operating table with normal respiration and normal color.
3. Barring operations which call for insufflation anesthesia the open method is suitable for any pa-

tient or any operation in which ether is the anesthetic of choice.

4. Experimental evidence shows that with the open method of etherization there is less injury to the lung epithelium than when the closed or semi-closed methods are employed.

5. Trouble during induction or maintenance of anesthesia is invariably due to faulty technic and not to the open method of etherization.

6. The conservation of body heat narcosis is of greater importance than warming the ether vapor.

110 S. ASHLAND BLVD.

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ETHER AND ETHERIZATION IN RELATION TO INFECTION AND IMMUNITY.*

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The subject assigned to me in this symposium by your committee will be approached from the practical rather than the laboratory viewpoint. A cursory review of the literature on the intraperitoneal use of ether in patients suffering of peritonitis will show that a preponderance of the evidence bespeaks its beneficial influence.

Souligoux in the *Semaine Medicale*, May 13, 1914, refers to a method of treating septic peritonitis by the introduction of ether into the peritoneal sac as proposed by Morestin in the *Bull. et Mem. Soc. de Chir. de Paris*, February, 1913, and Temon in the May, 1913, issue of the same journal. Souligoux practiced flushing the infected area with ether and removed by sponging before placing drainage tubes and closing the abdomen and was

*Read before the Joint Session of the Interstate Association of Surgeons and the Mississippi Valley Medical Association, February 6, 1917, at St. Louis, Mo.

convinced that this method of using ether not alone possessed merit but that it had actually saved a number of patients suffering of peritonitis that would have died had not the method been employed. The fact that some of his patients died thirty hours later and some immediately after the use of ether did not disconcert this intrepid observer, as he had often seen death during the course of anesthesia in patients suffering of peritonitis wherein ether irrigation had not been used.

Phelip and Tarteis, *Annales de Gynecologie et d'Obstetrique*, December, 1913, report sixteen cases of peritonitis in children due to appendicitis in which they used ether lavage with seven deaths and nine recoveries.

Janneret, *Rev. Med. de la Suisse Romande*, 1913; Waterhouse, *British Med. Jour.*, Feb. 6, 1915; Haines, *Transactions Cincinnati Academy of Med.*, 1915; Haines, *Transactions Miss. Valley Med. Assn.*, 1916, and Morton, *Women's Med. Journal*, 1916, have reported numerous cases illustrative of the beneficial influence or ether used intraperitoneally in conjunction with the usual postoperative treatment of peritonitis.

Waterhouse employed ether intraperitoneally in fifty-nine patients suffering of peritoneal infections with a mortality rate of 3.23 per cent. and believes that the addition of ether played a conspicuous part in reducing the death rate. He thinks that ether not only inhibits the growth of germ life, but actually destroys many of the germs and improves individual resistance by stimulation of the circulatory and nervous systems, thus enhancing the patient's chances of recovery.

For the past two and one-half years the writer and his assistants have used ether intraperitoneally in all patients suffering from peritonitis coming to operation at our hands, in the Cincinnati General Hospital and in private practice. At the Indianapolis meeting of the Mississippi Valley Medical Association last year, I reported to the Surgical Section on a small series of patients wherein ether had been used in conjunction with operation, drainage and other postoperative measures in the treatment of peritonitis. The mortality was 13.1 per cent. Since that report was made forty-three cases have been added with a mortality of 9.13 per cent., making a total of sixty-six cases with seven deaths, or a mortality of 10.4 per cent. for the entire series.

This series includes gastrointestinal perforations from disease, gunfire and stab wounds, abortion, leaking pus tubes and tuberculous peritonitis.

In a number of the more virulent cases ether was introduced through the drainage tube several times

during the first and second days succeeding the operation. Postoperative complications, including shock, prolonged anesthesia, vomiting, dilatation of the stomach or heart, dysuria, septic thrombophlebitis and gaseous distention of the intestines were not more frequent, severe or prolonged as compared with similar patients operated upon prior to adopting ether in the treatment of peritonitis.

In a fair percentage of the cases primary union was obtained throughout the line of incision and the patients recovered without going through a process of sloughing of the abdominal wall, frequent dressings, prolonged stay in the hospital, postoperative hernia and morbidity so frequently encountered in this type of infection.

Encouraged by the beneficial results obtained following the use of ether in peritonitis we gradually enlarged the field of application to other infected regions of the body; scalp wounds complicating skull fracture, other open fractures, osteomyelitis, tuberculous abscess cavities, sinuses, broken-down tuberculous testis, abscess of the thyroid, infected lymphatics and septic wounds of other soft structures, with very gratifying results.

Ether used locally certainly surpasses all other methods in preparing the scalp, axilla, pubes and scrotum for surgical procedure. We have in but one instance followed the practice suggested and practiced by the late Dr. J. B. Murphy of injecting ether into an infected joint cavity after aspirating the contents. The patient had had an osteomyelitis of the femur which had perforated into the knee joint cavity. The result in this instance was negligible, the patient refused to submit to an amputation and death followed.

L. Picque, *Press Medicale*, Aug. 19, 1915, and L. Ombredanne, *Bull. et Memor. Societe de Chirurgie*, report a large number of cases of gas gangrene wherein they had used ether after removal of foreign bodies and establishing free drainage. After thoroughly irrigating the wound with ether they introduced pledgets of lint which had been steeped in ether into the various cavities and recesses and applied a large compress saturated with ether over the entire field, this in turn was covered with cotton and other dressings with a view to preventing rapid evaporation by excluding atmosphere. Dressings were changed twice daily and the results were surprisingly good in that the infectious process was checked in from three to six days, although crackling and gangrene were present in some of the cases before treatment was instituted.

Dressing gas bacillus infections in this manner is a violation of the decrees of all previous surgical

and the results obtained by these observers furnish conclusive proof of the beneficial influence of ether not alone in immunization but likewise in the absolute destruction of germ life. The theory advanced by Gardner that ether and colloidal silver act by killing the bacteria or lessening their growth, thereby lessening the output of aggrains, is well supported by the experience of Picque and Ombredanne.

Objection has been made to the intraperitoneal use of ether because it favors the production of adhesions. Law, *Trans. W. Surg. Assn.*, 1914, in his laboratory experiments in the artificial production of peritonitis washed the soiled surfaces with ether before closing the abdomen. This result showed absence of general adhesions, slight omental attachment and a few guy-rope-like adhesions between coils of intestines. There were fewer adhesions than in the controls and when ether did not prevent it seemed to mitigate all forms of intraperitoneal adhesions. Personal experience gained by reopening the abdomen for ileus and other post-operative condition has led the writer to conclude that the formation of adhesions is dependent upon some inherent condition in the patient's makeup rather than to the type of infection or the use of ether intraperitoneally.

It has been the experience of every surgeon to operate in the presence of extensive peritonitis and encounter few or no adhesions, also to operate in mild infections and find extensive adhesion formation. There are some opinions contained in current surgical literature as to the cause of adhesions which need revision and others which require confirmation to be convincing.

Instances have been recorded wherein disaster followed so soon after the introduction of ether as to convince the surgeon that death was due or at least hastened by the presence of ether in the peritoneal sac. Our observations lead us to conclude that although not devoid of danger ether has very slight toxicity when placed in the peritoneal sac, we have seen no untoward results which could be directly attributed to the use of ether in this manner. In many of our patients sloughing of the abdominal wall at the site of the drainage tube and along the line of incision did not follow the operation and in those cases wherein sloughing did occur it was not as extensive as we had witnessed prior to the use of ether. Drainage from the peritoneal sac has not been as profuse or prolonged where ether was used; these features for betterment possess the double advantage of diminishing the necessity for frequent change of dressings and obviating prolonged stay in the hospital.

In conclusion the following is submitted for your consideration:

1. That the local use of ether in peritonitis has been clearly proven clinically to be of material benefit in making for the well being and recovery of the patient.
2. That ether may be safely used in peritonitis.
3. That the quantity to be used must be regulated to suit the age of the patient.
4. That the toxicity of ether when used intraperitoneally is slight.
5. That ether produces a certain degree of immunity from the ravages of toxemia for a few hours following its introduction into the peritoneal cavity which may turn the scales in favor of the patient's recovery.

JOSE FREEMAN, A.M.

LIQUID AIR AND ELECTROLYTIC OXYGEN FOR ANESTHETIC PURPOSES.*

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The increasing demand for oxygen in connection with various anesthetic agents, rescue work of various kinds as well as its use in the treatment of disease, makes it imperative that we should look carefully to our oxygen supply as to its purity.

The ever increasing price of oxygen for medicinal purposes, the increasing supply for commercial purposes with the great variation in cost, have led some of us to do a little thinking which has resulted in articles being prepared, read and published; and when we read in these articles that oxygen sells from \$1.50 to \$50 per hundred cubic feet we wonder where we are and when the game is going to stop. A saving of \$48.50 on 100 cubic feet or about 700 gallons of oxygen is an item that most of us can not afford to overlook.

Before we proceed to buy a cheap oxygen for medicinal purposes let us go a step farther and investigate the reason for the variation in price.

The advent of welding by the oxy-hydrogen and oxy-acetylene processes made the production of oxygen a commercial problem and we know that meant an oxygen produced at a cost that could be used at a profit.

Oxygen generation is of three classes, chemical, electrolytic and atmospheric, to each of which except the second there are subdivisions.

The chemical oxygen can not be produced at a

*Read at the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917.

profit for commercial purposes; this is not true of electrolytic and atmospheric methods.

Can commercial oxygen be used for medical purposes?

This is the question that confronts us and the answer will give us some information as to the great difference in cost that we note in some of the articles that are published.

We will first consider chemical oxygen. The most common chemical process is the dry evolution of oxygen under the influence of heat from a mixture of 100 parts by weight of crystallized chlorate of potash and 13 parts of manganese dioxid, contained in a sealed retort. The gas requires thorough washing in a solution of caustic soda to eliminate its chlorin. The fault with most chemical processes is the difficulty of eliminating the poisonous chlorin.

Electrolytic oxygen is produced by a group of oxy-hydrogen generators, each an electrolytic cell through which, by the passing of an electric current, water containing some alkali is decomposed. The oxygen collects at the positive electrode and the hydrogen at the negative electrode.

The two gases, as they collect on their respective electrodes, are effectively separated, and the bubbles rising as they collect are entrapped in compartments. The gases pass into pipe lines and thence into gas holders. A compressor removes the gases from the holders and pumps them into cylinders.

The impurity in electrolytic oxygen is hydrogen.

Atmospheric oxygen is produced by various methods, those in use in America are the Linde or German method and the Claude or French method.

The air is compressed to a liquid, then submitted to a process of rectification at the same time that an almost complete transference of heat is obtained from the compressed air entering the apparatus to the liquid air thus formed. The air is compressed by a four-stage compressor and after each stage the heat of compression is removed by passing the air through a cooler, through which water is circulated. The carbon dioxid and moisture in the air are readily eliminated by freezing and the oxygen becomes liquid while the nitrogen is still gaseous.

This explains in brief the principle of the separation of the gases.

The impurity in atmospheric oxygen is nitrogen.

We find the impurities to be hydrogen in electrolytic oxygen and nitrogen in liquid air and both hydrogen and nitrogen are inert gases and are harmless in the quantities in which they are found, but we must not jump at the conclusion that we can go to any plant producing commercial oxygen and pro-

cure our supply without first ascertaining if the plant is prepared to furnish oxygen in cylinders that are used only for medicinal purposes, as cylinders that are used for commercial purposes may at some time have been used for other gases that would render the oxygen unfit for medicinal purposes.

Again proper precautions may not have been taken in the production of the gas, while it would not injure it for commercial use, would render it unfit for our work.

Any commercial plant can be equipped to produce oxygen for medical use, but it will have to add the cost of equipment and analysis to insure to the consumer a pure gas, just the same as we demand chemically pure drugs and would not use a commercial article for medical purposes.

We must also remember that the price of commercial oxygen that is quoted as 2 cents a cubic foot or 2/7 cents a gallon means at the plant and does not take into consideration the added expense of drayage, freight and middleman.

Those of us that are fortunate enough to live near a commercial plant that will produce an oxygen that will come up to the following requirements will greatly reduce the cost and have an article that is safe for internal use.

Standards of purity recommended by Charles Baskerville and Reston Stevenson for oxygen to be used in the machine:

The gas should be neutral toward moist delicate litmus paper; and when passed through an aqueous solution of silver nitrate it should produce no turbidity. Not more than an opalescence should be produced when two liters of the gas are passed slowly through an aqueous solution of barium hydroxid. When five liters of the gas are passed slowly through an aqueous solution of sodium hydroxid, then over heated copper oxid, and finally through an aqueous solution of barium hydroxid, no turbidity should be produced. The gas should contain at least 94 per cent. oxygen upon the dry basis. As supplied for use, the gas should contain no liquids and no solids.

55 S. WILLIAM ST.

IF YOU DESIRE TO RESPOND TO THE CALL TO THE COLORS AND JOIN THE MEDICAL RESERVE CORPS, THE EDITOR OF THE SUPPLEMENT WILL COOPERATE WITH YOU IN SECURING A COMMISSION AND WILL ENDEAVOR TO SECURE YOU SUCH SERVICE AS WILL ENABLE YOU TO FOLLOW YOUR SPECIALTY. IF YOU CANNOT SERVE, PERSONALLY, PERSUADE SOME OTHER ANESTHETIST TO JOIN.

FATIGUE AND DEPRESSION OF THE NERVOUS SYSTEM IN SHOCK

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Never did it so much demand courage to discuss the shock problem in reference to the central nervous system as at present. Yet I shall make it my thesis that on the relationship of the nervous system to the remainder of the organism there can be founded a generalization which will embrace all forms of the shock symptom-complex. One is only made bold by the fact that the relative dominance of the nervous system, the first idea in priority, enunciated by Travers in 1827, while frequently in the hospital, has never been in the graveyard.

How broad the primary basis of generalization must be there is no need to emphasize. It is only arbitrarily that the symptom-complex of surgical, traumatic shock has by its frequency and severity and the busy attention of the surgeon become a standard. The very use of the term shock in allied states demonstrates a greater or less unity or kinship. Anesthetic shock and emotional shock are familiar examples; anaphylactic shock is more recently recognized as a cousin; and as a product of the great war there comes to the fore shell shock, old as a symptom-complex, but new in its special etiology through natural paths of special sense, not before so familiar to us. For all of these, and likewise for a multitude of other bodily states, admittedly overlapping the domain of shock, of which syncope, collapse, hemorrhage, sunstroke and drug effects are the most fully recognized examples, a community can be traced through the primary or secondary cellular reactions of the nervous system.

My investigations have not been on shock as a problem by itself. I have no prejudice of specializing in its field. It is true that my first cytological work was on material from experimental shock, but it soon became apparent that the real problem was that of the relation of the nerve cell to its environment, both internal and external, a problem in short of fundamental functional reactions. It is from the knowledge gained of these from all sources that the application to shock is made.

That the shock problem is primarily a nervous problem might seem to rest sufficiently on the fullness of knowledge that the nervous system is the medium of interrelationship between body and environment, and the chief agent of the body's own regulative and adaptive mechanism. If any one

doubts the sufficiency of that statement, shock as a nervous problem so rests because of the biologic attribute of differentiation. The nerve cell is specialized for irritability. Since it is totally irritable, no environmental change which touches that body can escape it, through direct or indirect ways. The habit is to think in terms of the limited and specific mechanism of body function. The cytologist sees more that is not translated into outward expression, because it is not conducted over specific paths. To say that motor cells are seriously involved in shock will probably meet unbelief, though muscular weakness is recognized.

Certain physiologists particularly seem to think that such changes of irritability are escaped easily enough. They not only deny fatigue to the nerve cell, but the implication is that in reflex action the rule of the neuron is merely a matter of conduction. For fatigue there is the positive evidence of objective change from the microscope, even if that fatigue does not display itself in a physiological experiment of considerable duration. The explanations of relative indefatigability are: *First*, because of the degree of differentiation as a nerve cell—the more primitive the greater the endurance; *second*, because of the abundance, and hence the reserve of cells; *third*, because of the wonderful dynamic reserve of the individual cell, again all objective evidence.

For the role of the neuron it is not only the transmitter of energy, but the energizer itself, the sole conceivable source of nervous energy. This energy is in tangible potential form, as witnesses the behavior of the nuclear chromatin, has limits, and is dissipated—hence the fatigue. The nerve cell is a self-charging storage battery, but in a continuous discharge the upbuilding from food synthesis can not keep pace.

It is the disregard of functional energy which is partly responsible for the way critics dismiss the cytological interpretation. They say the changes are the result of shock, not involved in causation—did he not find them in hemorrhage? The nervous system can be the butt of impulses; what gives them force is a mystery beside the question to the critic. The changes to be discussed include not only reaction but action. I am fighting for the every day activities of the nerve cell. The nervous system must be an energetic sharer in every phenomenon of shock, even when it does not initiate it, in the same way it is in normal physiological interactions, otherwise the organism would not be an organism.

The emphasis on this is because in my opinion the one thing that is muddling progress in shock

today is the perverted notion of minimizing or denying the nervous side of it. It does not follow that the nervous side is all-inclusive. The nervous system only shares according to its specialized co-operative place in the organism. There is not the slightest conflict that from the particular environmental changes which produce the particular state of shock, there result as well reactions independent of the nervous system, perhaps local, perhaps constitutional. Thus acapnia and acidosis may occur as collateral processes under the conditions necessary, which it is for special physiology to determine. Or in a skin burn there is not only the direct shocking effect on the nervous system, but a general toxemia with its reaction on all systems, not only the nervous, but, for example, the urinary. The resulting cloudy swelling of the kidneys gives its own symptoms, but further complicates the nervous reaction through retained poisons. Or in fat embolism, there are both the respiratory and circulatory effects, and their reactive effect on the nervous system which produces symptoms common to shock.

Proceeding now from the proposition that the phenomena of shock must emanate from and react upon the nervous system, the fundamental reactions of that system will be considered. These are very simple. The specialized dynamic property of the nerve cell is irritability, and the reactions are an exhibition of this property. Irritability for its display demands external influences. It can thus be increased or diminished. So without the cell there is the stimulus, within the reacting irritable substance. So variant in quantity and quality are stimuli that the stimulus can only be defined in Verwor's terms as "Every alteration in external vital conditions." It follows, therefore, from the constitution of the irritable substance and its relation to the stimulus that there are just two possibilities of internal cellular reaction, excitation and depression, and stimuli are either excitant or depressant.

These are no theoretical fancies. Physiology has produced this knowledge, and cytology not only confirms but adds to it. Not only would stimuli have been eventually so classified by experimental anatomy, but cytology goes physiology one better, by offering the mechanism of the reaction of irritability and the sources of energy of the reaction. Experiment with what stimuli you will, mechanical, chemical, thermal, trophic, electrical, and the anatomic reaction is either excitation or depression. There are no changes in nerve cells other than from these processes—unless you hit them with a hammer. They cover all reactions, whether under normal or abnormal conditions. It complicates problems

though it does not disturb principles that there is an intermediate group of stimuli which first excite, then later depress. Ether is an example which will make that clear. Shock then must be analyzed in terms of excitation or depression or both.

The finer analysis of the reaction to the stimulus is not within the scope of this paper. It is enough to say that the reaction of the nerve cell is sufficiently demonstrated to be a quantitative reaction. Being a reaction only of quantity, it is clear why the artificial, the abnormal stimulus, if it passes the threshold, produces the same effect as the normal one. The reaction is limited by the capacity of the irritable substance.

The anatomic basis of an experimental shock of traumatic origin may now be examined to see how it correlates with these principles. One finds primarily a state of functional excitation corresponding within certain well-defined variations to the degree of shock. A few cells are exhausted, denuded of chromatin, fewer and fewer cells are in rest, and between these extremes there are all stages of dynamic reaction. What is the physiological parallel? Mechanical stimulation of the wounding and handling is driving the cells through their stages of activity. The full series is activity, fatigue and finally exhaustion. But note that the whole process has been equally emphasized, not the exhaustion end. The sum total of activity of an organ that is always active is appreciably greater. It is most unfortunate that certain deductions have been rather limited to exhaustion, obviously not with correctness either in physiology or cytology. Absolute functional exhaustion, namely of all cells, I have never seen and never will see within the capacity of life of the organism.

Such processes, orderly though they are in the part of the nervous system affected, can not proceed without reaction on other parts and on the rest of the body. Hence they bring in their own complications, even if the original genesis is a single condition as trauma. The effects of such complications are best known by making them separate objects of study. The symptom-complex early ceases to be a matter of excitation, but depression is superimposed. Two factors will be used in example. Taking the fact that the blood pressure begins to decline, without worrying about its mechanism, the progressive cerebral anemia produces depression in its diminished food, lack of oxygen, and loss of waste. Depression produces decline of capacity of the vaso-motor center, decline of capacity of that center greater depression—a vicious circle. Or the ether factor is one of the quickest agents found in producing organic depression. Depression, an or-

the first is to make a series of changes as its quantitative opposite, activity, is just beginning to come into its own.

So a most complicated and variant state ensues in any case of experimental and clinical shock. Antagonistic factors they are in respect to activity, intensifying in respect to fatigue. On their special interplay, determined by the conditions in each case, the symptomatology depends.

Explanation of individual symptoms belongs more in the physiologic field, but one illustration will be given of how cytology clears up apparent discrepancies. For years a wordy battle has raged, those on the one side maintaining that the vaso-motor center is active throughout shock, those on the other asserting a fatigue, even unfortunately an exhaustion of that center.

What are the deductions from cytologic principles? There is some place for everybody. The vaso-motor center is a medullary center, and hence of a relatively low order of differentiation as compared with a cortical cell. It is consequently relatively more insusceptible to fatigue. The cytologist would expect, under its continuous excitation to function, an initial overactivity, followed by a stubborn maintenance of control, so that perhaps an absolute loss of irritability would not be apparent even within the limits of viability of the whole organism. Is not this in correspondence with the phenomena reported of vaso-constriction, of an irritable center up to death? On the other hand, its resistance to organic fatigue is quite another thing from an indefatigability. Fatigued the medullary cell can be, like all nerve cells, however remote the culmination of the continued process of exhaustion. Hence the claim of this side of the controversy must qualify that of the other. One can plainly see here one of the factors leading to the low blood-pressure-depression vicious circle.

So much must suffice for standard traumatic shock. Where now do the allied states, frequently set apart as pseudo-shock or shocklike, belong with reference to fundamental reactions? They involve the nervous system under the same limitations of capacity of the irritable substance to excitation and depression. Anesthetic shock, with an etiologic factor which is an initial excitant but an essential depressant, is different merely in its combination of excitation and depression. The roaring of bursting shells, auditory stimuli beyond description, excite an irritable substance already harried by trench life and drive it to fatigue. The mystery is not in shell shock, it is in the endurance and adaptive power of the mechanism. Hemorrhage, like ether, rests upon

an anatomic basis which is concrete. The same initial excitation and predominant depression, in its peculiar combinations, explain why it is like and yet unlike traumatic shock. For syncope, an example: the distended urinary bladder is emptied, the abdominal vessels mechanically fill, cerebral anemia results, the individual faints; the genetic factor, alteration in vital conditions, the effect, cerebral depression. Shall I dare to include emotional shock, which the heritage of superstition and ignorance yet tends to place in the brain but not of it, contrary to our law of the cell? The same mechanism is involved whether the pupil dilates, the face blanches, the heart's beat accelerates, or is suddenly inhibited from fear or from mechanical stimuli. Fear and the shock of fear must result also from stimuli working through irritability to excitation or depression. For diseases, rabies, tetanus, diphtheria and certain pyogenic infections, which have been studied, are varied enough types to show that there is an anatomic basis in the nervous system only of excitation or depression. The so-called degenerations are simply end phases of these processes.

From the nervous analysis then a definition seems safe. It does not ignore the relation of other body systems, for much evidence could be adduced that the basis of all body function is irritability. All organs must be affected by environmental change as their specific irritability permits. Shock can only be most generally defined as a phase of a universal relation between organism and environment: The disturbances in the bodily state which result from the concatenated processes of stimulation. Stimulation is the technical term which includes both excitation and depression, though too frequently applied to excitation alone. Shock is no specific state. The word should be a generic term for the sum total of variant states, even if technical usage continues its more restricted application. The vulgar usage is the correct one; the shock of operation, of injury, of fear, of hemorrhage, of vomiting, of disease. All kinds are included in the definition. That every degree is included is as important. Minimal degrees are not sufficiently recognized. Unless the patient blows up after operation, surgeon and anesthetist are inclined to congratulate themselves that he is as good as before. There are the same processes tending the same way in the patient who has stood the strain better. Heat is a condition of life; a rise of temperature produces an excitation, excessive heat superimposes a depression. Is the combined end result in prostration, the "sun stroke," the only effect that need concern us?

There only remains to discuss as briefly as pos-

sible the end results of shock. These are both immediate and remote. The immediate end result of excitation is exhaustion. When enough individual units are exhausted the nerve center or part is incapable of function. On the other hand, when depression becomes absolute total incapacity for function results. The two processes, diametrically opposite though they are, end in a common functional incapacity. These principles are well enough known, in physiology as well as cytology, only they have not been sufficiently applied. If there is complete constitutional prostration from the environmental reactions considered, medical men are prone to use the descriptive term collapse. In their writings, however, they are more uncertain. Some consider it identical with severe shock; others by arbitrarily electing to classify it under special genetic factors, like loss of blood, or body fluid, or poisons, or disease, provide themselves with a working distinction to start, through later somewhat vague as to why it does not continue to separate itself more plainly. The fact is, whatever the final state of shock, however induced, it is to be referred to the sum total of functional incapacity which is the end result of processes of excitation and depression. Let that be the definition of collapse, and retain it as a good descriptive term.

But there are also remote effects of stimulation. Excitation and depression, whether too severe or too long continued, end eventually, each by its own process, in senile change. No presumptive effect is this, but anatomical fact, each process differentiated by its own peculiar atrophy of form and loss of specific substance and bearing up to cell death its quantitative distinction. For a natural life, the wearing out of the nervous system is at some time inevitable. The price of activity is age; sooner or later the usury is greater than the substratum can synthesize. Shock, with its rude intensifying of the same processes, tends the same way, aids in hastening the event. The how of the mechanism is perfectly clear. Artificial stimuli, unusual stimuli, abnormal stimuli, all affect the irritable substance alike in a quantitative reaction; the same end must follow. Can one ignore the experimental fact that in a puppy at one year, with only a puppy's endurance, a most profound shocking operation leaves after a year's recovery a cell effect not distinguishable from a naturally senile dog of fifteen years? On the other hand, the reserve power in cells, the reserve cells, the regrowth which is recuperation, while they fool us as to the effect produced, conserve life for the organism. While I am not prepared to refer them to this or that part of the nervous sys-

tem, or to this or that alteration, there is a wide enough basis in such permanent cell changes for the so-called traumatic neuroses, whatever that word means. Surely not all are imaginary or counterfeit.

This is the cytologic analysis of shock, and it is believed only a beginning of a greater knowledge. But the cytological analysis can not be an end of the shock problem. It is merely a foundation for physiological and clinical analysis. Yet the cytologist may from his point of view venture to suggest that the prime need now is for the study of stimuli, first of their excitations and depressions kept separate from each other, then of their interactions, with the resulting inhibitions and summations. The physiological chapter will be largely written in terms of inhibition and summation.

The analysis does not smooth the road for the clinician. It does rather the contrary in its present state. It does make clear, however, that no one method of treatment can be applied to all possible forms of shock, or even to all phases of any particular form, and explains past failures. A predominant depression would seem to demand a different handling from an essential excitation, alike though their end effects are. Even if the latest suggested measures should be uniformly successful in overcoming the splanchnic engorgement, the fatigue or depression of the nervous system, though benefited by the normal medium, are states which would have to pursue their tedious course to recovery. Even here though the reserve and adaptive power might attest me on the looks of things a poor guesser, to put it mildly.

With fuller understanding of the permutations and combinations of stimulation of organic function, there is hope of progress. The results will necessarily be conditioned by the inevitableness of the processes under excessive or continuously acting agencies and by the primary state of the patient. But the methods of controlling the liability of protoplasm are surely not exhausted.

It sums it all up that the phenomena of shock are phenomena of the irritability of protoplasm, of which the accumulated knowledge began with Francis Glisson in 1672.

UNIVERSITY OF MISSOURI.

YOUR FELLOW ANESTHETISTS ARE IN SERVICE AT THE FRONT AND IN THE TRAINING CAMPS. REMEMBER THEM WITH FREQUENT LETTERS AND OCCASIONAL GIFTS. THEIR WORK IS ARDUOUS, DANGEROUS AND LONESOME. SHOW THEM THAT IT IS APPRECIATED BY THOSE AT HOME. SEND THEM GOOD-CHEER AND COMFORTS.

SOME OBSERVATIONS ON THE CAUSES
OF POSTOPERATIVE NEPHRITIS.KURT R. ROBERT, M.D.
INDIANAPOLIS, IND.

The subject of the role of infection in nephritis is not a new one, and, on the contrary, the literature accumulated is very voluminous. But a study of any series of routine urine examinations in relation to the individual case as it may be followed through under hospital observation gives rise to many new problems. Since the majority of cases coming under our observation are surgical, we became interested in the relative importance of ether anesthesia and focal infection with regard to postoperative nephritis.

In looking through the literature concerning postoperative nephritis we were astonished not only at the lack of definite knowledge on the subject but at the contradictory statements emanating from authorities of equal standing, few of whom offer any experimental data for their observations. It has long been the prevailing opinion among a large per cent. of the medical profession that ether anesthesia has been the prime offender. I have felt for some time from an empirical observation of several thousand surgical anesthetics that the importance of ether as a causative factor had been greatly exaggerated. In conjunction with Dr. Scott Edwards, critical studies of five hundred cases were made with this point in view.

Gwathmey, in his book on anesthesia, gives nothing definite with regard to the effect of ether on the renal tissue. Gröndahl, studying the effect of ether upon the kidneys, found in seventy-five ether narcotics, where the urine had been examined before the narcosis, albumin present in twenty-seven cases, always associated with cylinders excepting in three instances. The albumin frequently did not appear until the second day and promptly subsided in the majority of cases. The high percentage of albuminuria is referred by Gröndahl to the fact that in general these patients had undergone severe and prolonged operations. Albuminuria appeared at the end of the first day in 20 per cent. of the cases, and at the end of the second day in 16 per cent. The average duration of the albuminuria was from seven to nine days. In case of repeated narcosis the albuminuria appeared after each narcosis but with diminishing severity. Ether accordingly, in Gröndahl's opinion, does not cause an intoxication nephritis.

Connell, in discussing the excretion of ether, says "ether is chiefly excreted by physical diffusion into the alveolar air, a small amount is oxidized in the body. Owing to the physical affinity for fat, the fats and lipoids tenaciously hold a trace of ether so that excretion continues on the breath for as long as thirty-six hours. Sollman (1916) in the discussion of the toxicology of ether gives the opinion that anesthetics on direct application narcotize all cells of the lower organism as well as the higher, the concentration required for irritation is greater than is reached from systemic administration, and that chloroform and ether are absorbed almost instantly from the lungs and excreted promptly and almost quantitatively by the same channel. A small part is probably excreted by the urine.

Miller and Cabot, in a series of experiments on the effects of anesthesia and operations on the kidney function, found no definite relation of the decrease of phenolsulphonaphthalen excretion to postoperative albuminuria.

Honan and Hassler, in a report of three hundred and fifty cases of intravenous anesthesia in which ether was the agent used, give the urinary findings as follows: "The urinary analysis made before the operation and for three or four days afterward showed no marked differences in the specimens. The total amount was increased and specific gravity lowered during the first twenty-four hours; often the specific gravity and solid content of the urine remained unchanged. In no case, even after employing seven and five-tenths per cent. ether solution, did blood, albumin or casts appear in the urine, although German observers have reported occasional cases of transient hemoglobinuria after the use of the stronger ether mixtures.

Allen, in comparing the renal changes following operations under spinal, local and general anesthetics, states that 60 per cent. under stovain, 66 per cent. under local and 70 per cent. under general anesthesia show varying degrees of albuminuria. He quotes Hartleib as finding albumin in 78 per cent. of cases following operations under stovain.

In regard to the influence of focal infections upon the kidneys there has been some interesting work done recently. Orphuls, after the study of a thousand necropsies, concludes that not only the amyloid kidney but that subacute and chronic glomerulonephritis in the majority of cases is due to chronic sepsis, and calls attention to the probable danger in that respect of the existence of chronic local infections, such as so often are present in the accessory sinuses of the nose, throat, gall bladder and appendix.

Dick and Dick of Chicago, in the study of a series

of cases of chronic nephritis were able to demonstrate pathogenic bacteria from the urine in every instance. They have further elaborated this by a more recent series of experiments, a report of which appears in the Archives of Internal Medicine for March, 1917. Out of the eighteen cases of chronic nephritis studied, in eight they were able conclusively to demonstrate the presence of bacteria in the urine identical to those found at the site of local infection elsewhere.

In the study of our series of cases a complete examination of the urine was made before and after operation. In as many cases as possible catheterized specimens were used. Bacteriological examinations of the urine were made in a number of cases ranging from those with mere traces of albumin to the cases showing profound kidney involvement, in all of which cases catheterized specimens only were used.

Fifty-nine and three-tenths per cent. of all cases examined before operation showed some evidence of an existing nephritis. Five and six-tenths per cent. showed albumin alone; four per cent. showed albumin and casts; thirty-two and seven-tenths per cent. showed albumin and pus cells, and seventeen per cent. showed albumin pus cells and casts. In the postoperative urines sixty-four per cent. gave evidence of kidney involvement, an increase of four and seven-tenths per cent. The majority of cases showing postoperative kidney disturbance in which the preoperative urines were normal proved to be simple cases of albuminuria, which promptly subsided in a few days. In a certain number of cases which showed evidence of kidney disturbance before operation, the urine returned to normal abruptly following the operation. By far the largest percentage of cases showed no noticeable change in the pre and postoperative findings. In a comparatively small number of cases the evidences of nephritis were increased to such an extent as to indicate an acute kidney involvement. In this group of cases, without exception, all gave preoperative evidence of nephritis. In all cases of this type we were able to isolate pathogenic bacteria. The following cases are a few representative of the series:

Case 1.—Preoperative urine findings: Albumin, few pus cells, occasional granular cast. These findings persisted after keeping the patient several weeks in bed. The tonsils were removed under ether anesthesia. The specimen the following day showed an increase in albumin, pus cells, red blood cells and casts. A catheterized specimen was obtained and 2 cc. of the urine cultured in deep tubes of dextroascitic bullion. These cultures developed

a streptococcus which grew in chains of ten to fourteen. This organism was subcultured on blood agar and proved to be strongly homolytic. A quarter grown rabbit was injected intravenously with the growth from 15 cc. of the bullion and died in forty-eight hours. Autopsy showed the following: Heart, large and flabby; kidneys on section showed small hemorrhagic areas throughout the cortex. The bladder was full and contained urine which showed casts, blood, pus and a high per cent. of albumin. The organism was cultured from the kidney cortex, urine and blood in the heart.

Case 2.—Preoperative urine findings: Trace of albumin and few pus cells. Operation Panhysterectomy; pathology, cystic degeneration of ovaries and fibroid of the uterus. Streptococci were cultivated from the ovaries. Postoperative urine showed an increased amount of albumin, numerous pus cells, blood cells and casts. 2 cc. of catheterized urine was planted in deep tubes of a dextrose ascitic bullion broth. The cultures developed streptococci. A quarter grown rabbit injected, with the growth from 15 cc. of the broth, intravenously, died in twenty-four hours with the following findings at autopsy: Hemorrhagic areas over lungs, liver and spleen; kidneys showed two small areas of superficial cortical infection. On section there exuded sanguinous fluid and the tissue was deeply injected. The organism was recovered from the kidney, liver and spleen. The above are two of six cases in which this procedure was followed out with similar findings.

In six cases of acute suppurative mastoiditis, all showed evidence of nephritis in the preoperative urines. On five of these the urinary findings were greatly increased during the forty-eight hours following the operation, four of them returning to normal in a few days. In one case which was operated under nitrous oxid anesthesia, the positive urinary findings persisted for four weeks. One other of the cases which showed an increased postoperative disturbance was operated under nitrous oxid anesthesia. It was of interest to note that a number of cases with prohibitive preoperative urinary findings, when placed at absolute rest in bed for a period of time ranging from one to three weeks, in the majority of instances returned to normal and showed no exacerbation of the kidney condition after operation. In one case in which the urine contained granular casts, albumin and pus cells, the patient was kept in bed for two weeks, at which time the urine became normal. The patient was then subjected to a radical breast amputation, ether anesthesia being given for two hours.

...absolutely no evidence of infection involving either. In a few cases in which the urinary findings diminished but did not entirely disappear after rest in bed there was apparently no change in the urine following operation. In one case, however, in which the urinary findings were reduced to a mere trace of albumin after a rest in bed of one week, the patient was subjected to an abdominal operation involving the removal of chronically infected tubes. In the following thirty-six hours an acute nephritis developed, progressing into uremia and death. In this connection the recent work of Eisendrath and Schultz along the line of lymphogenous kidney infection proves interesting. They reach the conclusion that the kidneys are prone to infection from the pelvic organs and lower urinary tract directly through the lymphatics. Such an explanation, it seems to me, would throw a great deal of light on the dreaded renal insufficiency, so often following operations on the prostate gland.

To my mind there is no doubt but that the kidneys are liable to infection through the blood and lymph streams and that such is often the case following surgical operations on infected tissues. In fact, I believe that an infection is present in the kidneys in practically every case of postoperative nephritis of marked severity or of long standing. Of course, in patients whose kidneys are normal, there are many cases of albuminuria following prolonged operations, in which there has been considerable trauma to noninfected tissue, but such cases are physiological and are of no serious consequence.

Postoperative nephritis, in my opinion, is produced by a combination of causes, among which are: the existence of a kidney already crippled by infection; an increase in waste products to be eliminated incident to operative trauma and possibly the dissolution of lipoids; a decrease in the liquid output due to a diminution(?) in the ingestion of liquids and an increased loss of fluids through the skin, lungs and intestinal tract; lessening of its eliminative power by a lowered blood pressure in the kidney itself; a lowering of the power of resistance by the loss of body heat due to prolonged anesthesia and shock and lastly the filtering of bacteria and their toxins thrown directly into the blood and lymph streams from an infected tonsil, gall bladder, appendix, prostate or a much handled colon. In comparison with infection I would come to the conclusion that the irritation of ether plays a very insignificant rôle in the production of post-operative nephritis.

SOME OBSERVATIONS ON POSTOPERATIVE LUNG COMPLICATIONS.

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The frequency with which lung complications occur in the convalescent period of the surgical patient should be sufficient to keep us alert in avoiding the etiological factors in each case. It is opportune at this time of year and in this latitude that we have our attention again called to the matter, since one of the factors in the production of lung complications is exposure.

Picture to yourself the possible consequences of a case which is all too frequently repeated in many hospitals. A patient, an abdominal case, is placed upon the operating table with a pad consisting principally of rubber with a thin filling of cotton separating the bare back from the metallic top of the table. Covered with two sheets and an appropriate opening for the operative field the patient is maintained in anesthesia, attended with profuse or moderate perspiration, and further bathed along the back with fluids from the abdominal cavity or with drippings from the sponges for a period of minutes to hours in a room at 68° F. After the operation is completed the patient is placed upon a cart with a similar pad, lightly blanketed, and conducted through the corridor, which also serves as a ventilating shaft, to his room. He is now placed in a warm dry bed—if the water bottle hasn't leaked. He begins his stage of convalescence, which may be rudely interrupted by the onset of pneumonia by a fresh-air crank in charge of the case; by tight binders or unrelieved pain, which will interfere with pulmonary ventilation and expectoration.

Nor is it my intention of relieving the anesthetist of the great responsibility which he assumes in this regard. Has any one heard of an aseptic mouth? Are there any septic organisms which have not been found in the tonsils, in the pyorrhea pockets, of teeth, or in the nasal mucous? Can there be a question but that this septic material reaches the smaller branches of the bronchial tree when froth and mucous is permitted to churn back and forth from the mouth to the bronchial tree at each respiration, when it is possible to hear the gargling euphoniously named the moist rale which may also be heard over most of the chest for many hours after certain forms of anesthesia, with which we are all familiar?

While it is not the duty of the anesthetist to regulate the temperature of the operating room,

*Read at the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, Ohio, December 17, 1917.

yet he becomes a party to it if he is not conscious of a low temperature, one below 80°.

How does the anesthetist avoid responsibility and allow the patient to struggle for inhalation through mucous and a malplaced tongue? While it is doubtless true that the marked negative pressure in the alveolus assists the flow of blood from the right heart, yet an *exaggerated* negative pressure no doubt also produces an edema of the lungs, with an excessive flow of fluid into the alveolar cavity, reducing the vital resistance of this tissue and inviting the onset of coagulation.

Homans divides these postoperative lung complications into three classes: First, those directly dependent upon the narcosis and resulting directly from the inhalation or aspiration of septic material into the lungs; second, hypostatic pneumonia depending upon feebleness of the circulation and inability to keep the lungs clear, and third, embolic cases.

It would seem, therefore, that neither the hospital nor the anesthetist shoulders the whole responsibility for postoperative lung complications. In fact, Graves is inclined to consider almost all postoperative lung complications as exacerbations of preexisting focal infection. This, of course, is the extreme view in the opposite direction. That there are embolic cases there is probably no room for doubt.

In the recent literature upon the tonsils, we find a great deal written regarding pulmonary abscess following tonsil operations; while its occurrence is infrequent, especially in private practice; yet, because it does occur, many have sought its etiology. In this field, as well as in the general surgical field, there have been two views,—the embolic view, that the blood carries the septic material from the operating field to the lungs, and the view just stated, of the aspiration of the septic material directly through the air passages to the alveoli. The latter view seems to have by far the larger number of adherents.

Again, the hypostatic pneumonia in the feeble or old patients is beyond control of the anesthetists or the hospital.

Läwen found pulmonary complications as frequent after local anesthesia in the laparotomies performed at the Leipsic clinic while Miculicz has shown that the percentage of acute pulmonary complication following operations, is relatively greater under local anesthesia than when a general anesthetic is administered.

If these observations were universally correct it would seem to relieve the anesthetist of much re-

sponsibility which now rests upon him in regard to the occurrence of this complication.

Mortimer does not consider ether, per se, as a direct cause of postoperative lung complication. Its vapor, however, is irritating and may thus act as an indirect cause, particularly if it is given freely or with too close air limitation, or when the condition of the patient, or the nature of an operation renders it unsuitable, such as in pulmonary tuberculosis. The conditions which render ether inadvisable, of themselves predisposed to pulmonary complications.

Chapman, in presenting an account of experiments upon the irritant effects of ether, concludes that ether causes a swelling of the alveoli, congestion of the alveolar tissues, and even intraalveolar hemorrhage, which increase with the length of etherization and with the amount of crowding, or forcing of the ether. We should be interested in knowing how much of this effect was produced by obstruction to the airway.

There is another lung complication which at present may be considered uncontrollable by the anesthetist, hospital or surgeon. I refer to fat embolism producing infarcts of the lungs, the symptoms which result are often so similar to pneumonia that it cannot readily be differentiated clinically. Fat embolism has been known to occur in breast amputation, abdominal and other major operations, as well as more commonly following fractures of the long bones.

Homans, collecting the statistics of 16,043 laparotomies reported from European clinics, found an average mortality due to postoperative lung complications of about 4.4 per cent.

The combined statistics of Monroe, Risley, and Graves covering 3,089 laparotomies show a mortality of 0.4 per cent. The morbidity of this Boston series was 1.8 per cent or 57 cases. There were 34 cases of pneumonia, 20 cases of bronchitis, 3 of pleurisy and 6 exacerbation, in the previously tubercular. While the discrepancy between the Boston and European series may be partly accounted for by better anesthesia, and postoperative care, undoubtedly the percentage of septic cases and the desperately ill was not so great in the American series. Armstrong attributes the greater frequency right-sided pneumonia from the invasion of septic matter from the mouth and pharynx rather than through the blood and lymph. His statistics covering 2,500 ether administrations at the Montreal General Hospital, 1902-1905, showed 55 or 2.2 per cent. with lung complications within 48 hours after anesthesia. The patients ranged from 1 to 78 years. Ether appears to have been used in certain cases

for which this anesthetic was generally regarded as unsuitable. Clover's inhaler was, as a rule, commonly employed in the 25 cases 70 per cent occurred in the winter months. In 37 of the 55 cases, or 75 per cent, a septic focus in some part of the body was present before the development of the lung complication.

The 55 cases comprised: 14 of lobar pneumonia, 16 of broncho pneumonia, 19 of acute bronchitis, and 6 of pleurisy. In the series there were 39 cases of trephining, 8 of which, or 20 per cent, developed lung complication, which is explained on the basis of aspiration of fluid and vomited material into the air passages. There were 952 abdominal operations, 27 of which, 2.8 per cent, developed lung complications.

Crouch and Corner analyzed the record of 3,000 administrations of ether and chloroform, and other anesthetics, at the St. Thomas Hospital, London, in 1900. Of these 3,000 cases there were at least 10 in which bronchitis and bronchial pneumonia arose within 24 hours after the administration, the patients having displayed no evidence of these conditions beforehand. In all these 10 cases ether preceded by nitrous oxid was used. The ages of the patients were from 9 to 62 years. The operations were lengthy. In 6 cases there was bronchitis, in two bronchial pneumonia, in one bronchitis and pleurisy, and in one (fatal) bronchitis, bronchial pneumonia and pleurisy.

Before the Surgical Section of the New York Academy of Medicine, April 12th, 1916, Whipple and Bancroft reviewed their experiences upon this subject in the New York Hospital. Alma Vedin, their anesthetist, has collated their results as follows: During the year 1915 there were 15 cases of pneumonia, in 1,413 operations, or 1.06 per cent. Of these 15 cases, 7 ended fatally, a mortality from pneumonia of 46.6 per cent, and a total mortality from lung complications of 1.5 per cent. Seven of these cases developed lobar pneumonia, 3 edema of the lungs, and 7 bronchial pneumonia, of whom several gave X-ray evidences of tuberculosis. Three of the fatal cases followed severe peritonitis, so that the pneumonia was probably of terminal type. The questions as to whether the bronchial pneumonias were actually such or multiple infarcts was not determined.

Beckman has recorded 6,825 operations with pulmonary complications in 87 cases, none of which, however, resulted fatally.

In the annual oration before the Medical Society of London, Pasteur quoted Bibbergeil's statistics published in 1906, in which pulmonary after-effects

were noted in 7.2 per cent of 3,009 laparotomies, especially after operations on the stomach, and the records of 3,559 similar operations at the Middlesex hospital between 1906 and 1910 which showed a percentage of 5.66 with lung complications, and a pronounced incidences after operations on the stomach and liver.

Pasteur was among the first to hold that it was no longer tenable to attribute pulmonary after-effects mainly to general anesthesia. Pasteur considers that deflation of the lungs may be a predisposing cause of postoperative pneumonia. And in this connection Mortimer emphasizes the importance of the diaphragm in respiration and states if its movements be inhibited by the dread of pain, or hampered mechanically by bandages, the lower lobe of the lung collapses, which condition may go on to bronchial pneumonia or other form of inflammation, if the infective organism be at hand.

Mortimer further points out that the rising temperature, viscid expectoration, painful cough and breathing subside within 24 hours, unless bronchial pneumonia supervenes. It will be realized at the same time that operations in the upper abdomen are usually prolonged, more frequently associated with relative overdosage in securing an extreme degree of relaxation, and that the patient is more frequently maintained in a dorsal position for a prolonged period after the operation.

In this connection it would seem advisable to use moderate doses of morphin for the relief of pain that free respiration might be indulged and collapse of the lower lobe avoided.

SUMMARY.

In this series there were 39,438 cases, lung complications occurred in 3.03 per cent of the cases in which figures are available. There was a total mortality of 1.06 per cent. Of these lung complications 48 per cent were pneumonia, and of the pneumonia cases 48 per cent were fatal. In one of the series 70 per cent of the lung complications occurred in the 5 winter months.

CONCLUSIONS.

The frequent occurrence, 3 per cent, of postoperative lung complication should be reduced by

1. Maintaining warm operating rooms (80 degrees F.).
2. Operating table pad of non-conductor material 3" thick and soft enough to be comfortable and warm.
3. The avoidance of drafts and provision for protecting the patient while transferring her to her room.
4. The maintenance through the entire period of anesthesia of a free air way both as regards mucous and the soft tissues.
5. The avoidance of ether in cases in which it is contra-indicated.
6. The elimination of tight binders over the diaphragm.
7. Encouragement of full breathing, which may require moderate doses of opiate to relieve pain thus caused.
8. Changes of the position in bed at frequent intervals during the first week.

COMPARATIVE DANGERS AND AVAILABILITY OF NITROUS OXID-OXYGEN ANESTHESIA.*

JOHN R. McCURDY, M. D.,
PITTSBURGH, PA.

Perhaps it were just as well at the beginning of my remarks to state that I am firmly enlisted in the ranks of nitrous oxid-oxygen advocates; that I am fully convinced that, with the best modern apparatus, in the hands of an anesthetist of experience, it is today the best anesthetic agent available. No anesthetic is safe in inexperienced hands and the best results cannot be expected without good armamentarium.

But in order to disarm any prejudice that might influence the present discourse I have approached the subject negatively, so to speak, seeking facts and testimony that tend to argue against its value and safety. Necessarily, I will be guilty of repeating many things that have been published by other contributors and investigators, but only, I trust, by those of recognized authority.

Since my subject comprehends primarily a comparison of anesthetic agents let us clearly understand what is the criterion. The vast majority of professional anesthetists will agree that the *best anesthesia* is that which is least harmful to the patient—immediately and remotely—and the *best anesthetic* the least harmful agent; for all anesthetic agents are poisons, and in some degree injurious to the economy. I say, advisedly, the majority of anesthetists, for there are all too many surgeons who consider that anesthesia best which will enable them to operate with ease and convenience and in the shortest possible time, sublimely indifferent to any injury done the patient.

What are the dangers of anesthesia? The gravest one, and the only one considered by the laity and by some operators, is *death during administration*. How, then, are we to compare nitrous oxid-oxygen with other agents in this regard? You answer by quoting from your favorite statistician the number of deaths per thousand administrations of gas, ether, and chloroform. Personally, I attach very little importance to anesthesia statistics.

MORTALITY.

Mortality statistics, as usually published, are unreliable evidence, because they are enumerations, compiled from bald records at scores of distant sources, of deaths occurring under this or that anesthetic, assuming that these deaths were caused by the specified anesthetic agent. How many of

them are due solely or in part to unskillful surgery; to surgical accidents; to faulty technique; to lowered resistance; previous shock or moribund condition of the patient can never be known. We all know that many *so-called anesthetic deaths* are partly or wholly due to other causes and conversely many postoperative deaths are credited to various other causes which are at least partly due to the anesthetic. We need not suspect the honesty of statisticians or of anesthetists who report their results. But unquestionably the personal element, together with the impossibility of obtaining exact detailed information of every administration of a comparable number of cases of the different anesthetics to be compared, render statistics inaccurate. But if you accept the evidence of statistics alone as conclusive the case of nitrous oxid-oxygen is won at the start, for all authoritative statistics show it to be responsible for the lowest mortality rate and therefore the *safest*.

It would be a useless waste of time for me to quote at length published statistics of the many reliable investigators to which you can all refer at your leisure. The statistical work of Miller in The Year Book (1915-16) is perhaps the most exhaustive and reliable, as well as the most recent authority on the subject. From it we learn that the approximate relative mortality under various anesthetics is about as follows:

Nitrous oxid-oxygen: 1 in 13,000 to 35,000.

(If dental administrations are included, and the use of nitrous oxid alone and with air, the rate is as low as 1 in 1,000,000.)

Ether: 1 in 4,500 to 55,000 (average 1 in 8,010).

Chloroform: 1 in 1,300 to 3,200 (average 1 in 2,665).

Ethyl Chlorid: 1 in 1,800 to 13,300.

Spinal Anesthesia: 1 in 158 to 800.

Our discussion has to do, of course, with nitrous oxid-oxygen anesthesia. The day of nitrous oxid alone is past except for very brief anesthesia or analgesia. Pure nitrous oxid—and it is only in quite recent years that chemically pure nitrous oxid, free from poisonous by-products, has been obtainable—pure nitrous oxid without oxygen, or even with uncertain quantities of air, is undoubtedly a dangerous drug. Yet Frederic Hewitt in 1907, after careful search of both medical and dental literature covering a period of 40 years (1860-1900) and personal inquiries in addition, was able to collect records of *only 30 fatalities*, and himself classifies 10 of these as doubtfully or not at all due to the anesthetic. He further asserts "It is now universally admitted that nitrous oxid is the safest general anesthetic known when administered with a proper percentage of oxygen . . . its inhalation is practically free from risk to life. Even when pure nitrous oxid is given by one familiar with its use

*Read during the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917.

the risk to life is so slight as to be almost negligible. So far as the author is aware no fatality has yet

(1911) been reported under nitrous oxid and oxygen." Such testimony by one of the leading authorities of the world must certainly carry weight. But is it not reasonable to believe that in the past ten years nitrous oxid-oxygen anesthesia has been rendered still more free from risk by improved methods of manufacture and vastly improved apparatus? It is a lamentable fact, however, that a considerable number of fatalities under nitrous oxid-oxygen have been reported in the past few years

and some of us may know of others that have not been reported. Why is this? The gas itself as produced today by reliable manufacturers is surely not less pure than the product of ten or fifteen years ago and apparatus is far better. The reason may be found in an article by Gwathmey in the *British Medical Journal* of March 24, 1917. He says "... while the latest available statistics give first place, as regards life, to nitrous oxid-oxygen, yet so many deaths have been reported from time to time, since the more general use of this combination that we are forced to the conclusion that it is not as safe as is generally supposed, at least with our present methods of administration." I do not think that the usual proper methods of administration as understood today by competent anesthetists are at fault. But the recognition by surgeons in recent years—through their own investigations and their education by anesthetists and not through advertising—of the superior value of this anesthetic has led them to become perhaps overenthusiastic and to place it in the hands of untrained anesthetists who have administered it with overconfidence and even recklessness. Another mistake that has no doubt led to fatal results is the *pushing* or forcing the gas in the effort to secure greater relaxation by deeper anesthesia. Nitrous oxid-oxygen has its limitations as does any other anesthetic and these must be respected. The admixture of oxygen must be constant and in sufficient percentage—be it 4 or 24 per cent.—to prevent jactitation and cyanosis beyond a slight purple or rose color.

Granting that the physiology and pharmacology of nitrous oxid is still *sub judice*, the fact obtains that death is apparently due to asphyxia or a physiological complex that is indistinguishable from asphyxia, and this can be prevented by sufficient oxygen and free unobstructed respiration.

RESPIRATORY SYSTEM.

Asphyxia, therefore, if you will allow the term, may be classed as the chief danger referable to the respiratory system. The other anesthetic which may be compared in this respect is ethyl-chlorid,

which may cause death by spasm of the respiratory and laryngeal muscles, although there is here the coincident element of heart paralysis which does not pertain to nitrous oxid-oxygen. The effect in both is due to overdosage plus faulty ventilation. The one other prominent respiratory danger with all inhalation anesthetics is postoperative pneumonitis, inflammatory, tubercular, or pneumococic. This sequella has for years been persistently blamed on the anesthetic, especially ether, and the term *ether pneumonia* is still frequently heard. Ether vapor is of course more irritating to mucous membranes than any other anesthetic and when applied continuously for an hour or more tends to break down the defense of these tissues. Chloroform and ethyl chlorid do less harm in this respect and nitrous oxid-oxygen least of all. Postoperative lung troubles occur after all anesthetics, even spinal. The anesthetic acts only as a contributory factor in the lowered resistance and disturbed metabolism resulting from the whole operative procedure. It is my firm belief that a very large majority of postoperative pneumonias are entirely due to careless nursing and exposure.

CIRCULATORY SYSTEM.

With reference to the circulatory system the effects of various anesthetics which may be immediately or remotely dangerous have to do chiefly with the heart and blood pressure. In regard to effects upon the heart muscle and its nervous mechanism, nitrous oxid-oxygen is indisputably the least injurious. Heart complications are conspicuous by their absence and at no time, even in four or five hours continuous gas anesthesia, do we see the violent stimulation of early-stage ether, followed later by rapid, thready pulse; the alarming depression of chloroform or the heightened pulse pressure of ethyl chlorid.

Changes in blood pressure, or what is more significant, as pointed out by Drs. Moots and McKesson, in pressure ratio, are universal effects of all anesthetic agents when exhibited to the point of complete anesthesia. Under nitrous oxid-oxygen properly administered the variation in pressure ratio is so slight as to be scarcely perceptible and indeed is frequently such as to be beneficial rather than otherwise. A preexisting hypertension, particularly when accompanied by arterio-sclerosis, is commonly stated as a contraindication to nitrous oxid-oxygen. This does not seem to be supported by clinical reports nor by my own experience. In a large general surgical clinic I am called upon to anesthetize a considerable number of patients with hypertrophy of the prostate for the two-stage suprapubic prostatectomy. As a class they are poor anesthetic risks, especially for ether, a large percentage of them be-

ing past middle life, having increased blood pressure, various degrees of arterio-sclerosis and bad kidney conditions. Nitrous oxid-oxygen is undoubtedly the anesthetic of choice for them and I have yet to see any change in blood pressure sufficient to cause the least apprehension, the variation, if any, being transient. Compare this absence of one very important element of danger with the persistent, progressive and protracted hypotension under third-stage ether; the even greater depression of spinal anesthesia and the sudden alarming fall under chloroform. As asphyxial hypertension may often be seen in a poorly managed gas anesthesia due to insufficient admixture of oxygen or obstructed air passages. But this is the fault of the anesthetist, not the anesthetic.

Concerning the changes in character and constituents of the blood under different anesthetics the researches of Dr. Theodore Castro, of Dr. Crile and others seem to indicate that whatever changes occur in coagulability, hemoglobin content, cell relations and morphology, hemolysis or acidity are more or less transient and do not constitute elements of especial danger. But they prove that all such blood effects are far less marked and less enduring from under nitrous oxid-oxygen than other anesthetics. This is particularly marked in comparison with ether, which produces a leucopenia and reduction of hemoglobin that often persists for days.

GLANDULAR SYSTEM.

Time will not permit us to discuss in detail the comparative effects of the different agents on liver, kidneys and the endocrinal glands. But published researches satisfactorily prove that deleterious effects of nitrous oxid-oxygen are either nil or transient and constitute neither immediate nor remote dangers to the patient, the normal or preanesthetic functioning of all organs becoming reestablished within a few minutes or an hour after the anesthetic is removed. Is not this a most vital element in the problem of recovery from operative shock? Again, in the much-discussed field of acidosis, while it is not claimed that nitrous oxid-oxygen anesthesia is never contributory to this postoperative complication, it is certainly associated with far less acidosis, if any, than other general anesthetic agents. Metabolism is only transiently, if at all disturbed, as also the phagocytic power of the blood. The effect of ether, on the contrary, is such that the patient's opsonic index is not restored to its preoperative level for from two to five days or longer. This feature of nitrous oxid-oxygen anesthesia renders it particularly available in septic cases, anemias, chronic debilitated patients and tuberculosis. These latter con-

siderations, together with its prompt and complete elimination, the absence of appreciable injury to any cells of the body, the vastly better psychical condition and the ability of the patient to resume nourishment early, certainly reduce postoperative dangers to the minimum.

INDICATIONS AND LIMITATIONS.

One of the chief arguments for the safety of nitrous oxid-oxygen and its value to the surgical profession lies in the fact that, in the presence of what may be classed as *grave surgical risks*, severe infections; pathologic and symptomatic anemias, traumatic shock, acute pulmonary affections, and moribund conditions, the *surgeon* chooses this anesthetic *because it will do his patient less harm, immediately and remotely, than any other general anesthetic*. He may elect to operate under local anesthesia if possible or under intraspinal injection in a few cases; but when all other general anesthetics are contraindicated he will call for *gas*. All authorities agree that nitrous oxid-oxygen is the choice for minor operations and cases of short duration, the only objection offered being its high cost. This latter consideration should be unworthy of the careful surgeon, for the welfare of his patient should certainly not rest on the question of an added expense of two or three dollars per hour of operating time. Moreover, if the patient or friends are consulted and the advantages of quick, comfortable induction, absence of choking and smothering sensations, prompt recovery without nausea and vomiting, and greater safety explained to them they will scarcely ever hesitate to assume the slight additional expense.

In enumerating its pathologic contraindications authors are accustomed to mention chiefly the following: (1) Respiratory obstructions, such as very large tonsils, tumor or cellulitis of neck, emphysema, empyema. (2) Pronounced arterio-sclerosis or atheroma. (3) High blood pressure. (5) Aneurism. (5) Dilated or fatty heart or uncompensated valvular lesions. I have mentioned these in the order of their importance. But as I have already asserted the dangers during administration of nitrous oxid-oxygen are almost all predicated on the occurrence of asphyxia, which by skillful administration can always be avoided. Excluding this possible element of danger the above contraindications are no more potent with nitrous oxid-oxygen than any other general anesthetic.

The field of abdominal surgery embraces a comparative and reasonable objection to this form of anesthesia in the feature of insufficient muscular relaxation. Beyond question nitrous oxid *per se* does

lies one of its chief elements of safety, for the preservation of muscle tone is a very important desideratum throughout the entire surgical procedure. Several anesthetists have asserted that they are able to secure any necessary abdominal relaxation with nitrous oxid-oxygen. But their technic usually embraces the employment of adjuvant agents plus the intelligent cooperation of the surgeon. By conscientious and studious team work of surgeon and anesthetist beautiful results are possible.

Abdominal surgery can be and is being done with entire satisfaction under nitrous oxid-oxygen anesthesia; but if the surgeon demands absolute relaxation or *dish-rag* anesthesia, if I may term it such, without supplementary anesthetics and conscientious team-work, both surgeon and anesthetists are alike frequently doomed to disappointment. Outside the abdominal field there are limitations to the availability of nitrous oxid-oxygen from the operative standpoint, not as to safety in general. Nose and throat operations as well as brain surgery may be better accomplished under ether-vapor insufflation, the former because of the difficulty in maintaining an even plane of anesthesia and the latter because of greater congestion of the peripheral circulation under nitrous oxid-oxygen.

As to age limitations there need be practically none in the hands of a skilled anesthetist. Very young children are said to be bad risks for gas anesthesia because of their greater liability to asphyxia. This disadvantage is offset, however, by the fact that complete anesthesia can be maintained in children with a very small volume of nitrous oxid and a correspondingly higher percentage of oxygen. My own experience has embraced patients from six months to eighty-four years of age.

The large field of anesthesia for dentistry and oral surgery I leave to the specialist in that branch of the profession, offering, in passing, my opinion that the management of successful and satisfactory nitrous oxid-oxygen anesthesia for oral procedures is a more difficult matter than for major surgery, mainly because of the necessarily attendant irregular breathing, the limitations of the upright posture, the difficulty of regulating the mixture of gases on account of air dilution by mouth breathing, especially during the nasal technic of administration. Of its value as an analgesic and anesthetic in their specialty the most experienced dental surgeons and anesthetists preponderantly testify.

In closing I shall mention one other field in which nitrous oxid-oxygen analgesia and anesthesia is eminently available and should, I believe, supplant all other anesthetics. This is the field of obstetrics. Its quick and pleasant induction, its rapid elimination, its comparative absence of immediate or remote danger to mother or child, and its really efficient relief of pain, even in the form of analgesia, render nitrous oxid-oxygen the anesthetic of choice in normal labor and operative obstetrics. It has the very great advantage over morphin-scopolamin amnesia of being under the prompt and absolute control of the anesthetist and obstetrician.

VAPOR ANESTHESIA.*

JOHN J. BUETTNER, M.D.

SYRACUSE, N. Y.

The first account of vapor anesthesia was by Junker, in the *Medical Times and Gazette*, November 30, 1867. Valuable as this method is, it, like all other anesthetic methods, was apparently anesthetized for many years. As would be expected, Junker's apparatus had its faults, in consequence of which fatalities ensued. The afferent and efferent tubes were connected improperly or the Junker bottle was tilted. The result was that liquid anesthetic, in place of vapor, was delivered to the patient. It is with some pride, however, that, even at those times, were found anesthetic enthusiasts, who brought forth modifications of the Junker apparatus to remedy the existing defects and faults.

Chloroform is the only anesthetic mentioned in connection with the Junker and, later, the Clover and Harcourt outfits. The prejudice against chloroform was as strong then as now. While the great value of vapor anesthesia, especially for nose, throat, and mouth work, was recognized, no one had used ether in this way. Clover, in 1877, demonstrated the advantage of ether vapor, especially when warm. It is quite interesting, in looking up anesthetic history, to notice the various outfits and modifications that have been devised for vapor anesthesia. The first real valuable and popular apparatus was the well-known Gwathmey three-bottle arrangement.

It might be well to specify that in this paper the designation *vapor anesthesia* implies that form of anesthesia that depends on force from behind to convey it to the patient. It might perhaps be better to follow the suggestion made by Coburn, in the *New York Medical Journal* of June 1, 1912, and call it *insufflation anesthesia*.

While vapor anesthesia has its most extended use in nose, throat and mouth operations, it is also of great help in all types of surgical operations. The force from behind is variable. Hand bellows were first used, then foot bellows, heat, and connection with an oxygen tank or with an electric blower. While these have all been quite successful, the most commendable one is the oxygen tank. Gwathmey, in his text-book on Anesthesia, and in an article in the *Medical Record*, November, 1904, has conclusively proven, experimentally and by clinical observations, that oxygen increases the safety of all anesthetics, without decreasing their anesthetic effect.

*Read before the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917.

Andrews, of Chicago, in 1868 announced the advantage of oxygen in connection with nitrous oxid. Hewitt, in his admirable work, explained the advantage of oxygen over air with nitrous oxid.

Today, there is absolutely no question or doubt in regard to the value of using oxygen in connection with nitrous oxid,—in fact, with some there is a grave question as to whether one is justified in using nitrous oxid without oxygen, even in short operations. Neudörfer, of Vienna, in 1886 introduced the use of oxygen with chloroform. Bertel stated, before the St. Petersburg Medical Society, that a more rapid and successful anesthesia, practically free from danger, was obtained with oxygen and chloroform.



Figure 1. Buettner Airway.

We all know that asphyxia is produced, not altogether by excess of carbon dioxide, but by lack of oxygen. Irregular breathing may be due to lack of oxygen. How often have we, in watching the induction of anesthesia, seen the patient fight, choke, and become cyanotic; all, or in great part, at least, due to lack of oxygen. The patient's fight is justifiable and might properly be termed one of self-preservation. There is no doubt, also, that the attitude and personality of the anesthetist is also a very great factor in the smooth and successful induction of anesthesia. Too little attention is given to psychology and its relationship to anesthesia.

The writer has had considerable experience with vapor anesthesia, first with the Junker apparatus, later the Gwathmey three-bottle arrangement. For the past few years I have used the Autogenor. In this apparatus oxygen is generated by the contact of water upon fused cakes of sodium peroxid. This is, also, a three-bottle arrangement—one for water, one for ether, and the third for either ether or chloroform. The generator and bottles are encased in an asbestos jacket to retain heat, which is created in generating the oxygen. While the advantage of heating the anesthetic vapors is still a matter of controversy, there is no contraindication, to my knowledge, unless the vapors are heated too much. The heating of the anesthetic vapor, however, is not the redeeming feature of this apparatus, but, rather, the fact that pure oxygen is present at all times.

The method which I have found most satisfactory, especially for nose, throat, mouth, and eye operations, is as follows:

I use a Lumbard mask, upon which I always drop some cologne or essence of bitter orange. This mask is connected with the autogenor, and the oxygen started at once. Anesthol, which is a chemical union of ether, chloroform, and ethyl chlorid, is used by the drop method to induce anesthesia.

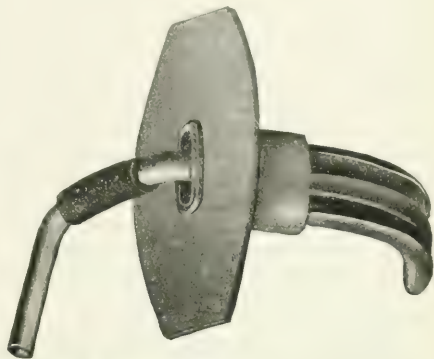


Figure 2. Buettner Airway arranged for Oral Anesthesia.

While not unmindful of the great prejudice against chloroform or any combination with chloroform, I have had very happy experiences with it. The experience of others, according to all reports, who use chloroform and oxygen has also been very satisfactory. There is no doubt but that the anesthetist, rather than the chloroform, is the offender in many cases.

Anesthol is dropped slowly on the mask until the irritating effects on the respiratory mucous membrane are passed, when ether is turned on from the autogenor. The ether-oxygen is then continued until full surgical anesthesia is secured. In throat and mouth cases, the mouth gag is now applied and the anesthetic vapor continued, either with crooked mouth tube or nasal tubes.

I might add that the use of an aspirator in this kind of work is of marked benefit to patient, surgeon and anesthetist, in maintaining a clear operative field and patent airway.

In work on nose or eye, where a general anesthetic is given, I use an airway anesthetic mouth tube after the patient is fully anesthetized. The patient should always be fully anesthetized before an airway tube is inserted. This tube holds the tongue forward, furnishes an airway, and has a tube for anesthetic vapor. The tube is easily sterilized and with its use the anesthetist is not in the surgeon's way.

When using vapor anesthesia for general surgery I use a modified Fox-Hard mask with a rubber face cushion. This furnishes a larger space for re-breathing than the regular mask, and then the anesthetic vapor is less irritating, due to the point of entrance of the vapor being further removed from patient's face.

The induction, with this method, has been most pleasant, the color and respiration being good at all times. The awakening comes almost as soon as with gas-oxygen and is usually with a smile. The after-effects are usually nil, due, no doubt, to the use of oxygen. Several authorities have testified to the lack of nausea in cases where oxygen has been used in connection with the anesthetic. The majority of cases have had no preliminary medication. One other factor that contributes to the well-being of the patient, postoperatively, is the proper preliminary preparation of the patient. Fortunately, there is great cooperation at present between the surgeon and the anesthetist, and the anesthetist is gradually, but surely, reaching that position in medical science to which he is justly entitled, that of a full-fledged specialist.

In conclusion, I wish to lay special stress on the value of oxygen in connection with all anesthetics. By its more frequent use we will be able to have a smoother induction, a safer conduction, and a more rapid recovery.

In the issue of the *Journal of A. M. A.*, October 6, 1917, there is a very interesting article by Dr. S. J. Meltzer, entitled "The Therapeutic Value of Oral Rhythmic Insufflation of Oxygen," with description of a simple apparatus for its administration. In resuscitation and in treating gassed patients this method gives promise of clinical results.

1208 So. SALINA ST.

THE ASSOCIATIONS OF ANESTHETISTS ARE CONSTANTLY STRIVING TO IMPROVE THE SPECIALTY OF ANESTHESIA AND CONSERVE THE STATUS OF THE ANESTHETIST. MEMBERSHIP IS A SINE QUA NON TO SUCCESS. NEXT IN IMPORTANCE TO BEING AN ACTIVE MEMBER IN THE ASSOCIATIONS IS ENOUGH INTEREST IN THEIR WELFARE TO BRING IN NEW MEMBERS TO THE EXTENT TO ADVISE YOUR FELLOW ANESTHETISTS TO JOIN. IT WILL REPAY THEM.

ANESTHESIA.*

GEORGE K. DICKINSON, M. D.
JERSEY CITY, N. J.

It gives me great pleasure indeed to come here and talk to this body of surgeons, men who are in active emergency work, when almost all of my work is elective, and to bring to you some ideas. But I got one idea from you this morning which I hope I will never forget, and be able, Mr. President and Dr. Chaffee, to hand down to the young surgeon as I meet him from time to time in the hospital, and that is, "Weed Your Garden." It would make a mighty good paraphrase. If Dr. Chaffee hadn't been weeding his garden all his life, this association wouldn't be twenty-six years old, because I know the story of the association. And it is the man who weeds his garden that gets to success, and it is the weeds that we come here to dig out. Dr. Cavanaugh dug out one to-day. I wish we could all go into our gardens and remember that nature cures—for we fool around and so prevent nature from curing, in a general way—interfere.

Another weed in the garden is anesthesia, ignorantly and carelessly given. And that is the one thing that interests me in my little paper. And if I tell the truth in it, and I hope I do, or if there is not truth in it, I want your discussion. It will perhaps help you to do something for your profession and for your patients by seeing that anesthesia is properly given. And if you don't do it the legislature is going to, and you know how clumsy the legislature is.

The danger, discomfort and distress of anesthesia are quite co-equal with major surgery. Operations through simplicity of technic and anesthesia "without tangible misfortune" have produced a type of "jitney" surgery which delights the tyro and pleases the whim of many.

Before the time of narcosis such surgery was done as was imperative. People were strapped to a table, some laudanum given, and quickly the work was over, hemorrhage staunched and the wound allowed to heal as best it might. Pain and danger suggested surgery. Danger and pain followed.

Then in quick succession, as though Providence willed it, there were three discoveries. The practical and surgical application of narcotic substances which had been used as toys previously. The bacillary cause of wound infection, and Lister's pronouncement as to antiseptics. One without the other would have made surgery incomplete. The three together have been the foundation on which a

* Read before the meeting of the New York and New England Association of Railway Surgeons.

rational scientific and much safer surgery has been developed.

In the history of anesthesia is seen a repetition of that so often noted. As Faraday discovered electricity and Edison developed it, as Henry of Princeton discovered telegraphy and Morse gave it to the public, so Long of Georgia in 1915 used ether in surgical work, but failed to inform the profession, and Morton of the Massachusetts General Hospital publicly exploited it in 1846.

Then in rapid succession chloroform was introduced by Simpson in 1847, and somewhat before that nitrous oxid was demonstrated by Wells.

Big truths forcibly presented, even though they may meet and relieve conditions long deplorable, always excite prejudice. In the medical profession there are those who are held back by what we call conservatism. They become obstructionists, and fail to give proper impetus because of narrow sight. Amongst the laity, religious beliefs and a too material interpretation of the Bible has stayed the hand of science and scientific advancement.

So ether and its associated narcotics were attacked. Churches preached against them as being contrary to the laws of God and nature. Legislatures and the public forum did what they could to handicap these wonderful friends of the afflicted. And prejudice is not dead to-day.

In a short time deaths commenced to occur—a type of death which had not been noted without the anesthetic—and, naturally, these were laid to the effect of the narcotic. This perturbed and led to an endeavor to find some drug which would blank the mind, suppress the sense of pain and not have a toxic effect upon the system. Numerous substances were discovered and exploited and many methods of narcosis devised. Statistics have been compiled, but through ignorance of the action of narcotic agents, through the impurities which they contain, and, perhaps more than all, through the personal equation of the man administering the anesthetic, these have proved futile. Then again, climate and time of year have a marked influence.

A chemically pure anesthetic, one which has not been adulterated in the making, or which has not been decomposed by time, air or sunlight, whether chloroform, ether or nitrous oxid, is the only anesthetic to be used.

On being inhaled the first effect is upon the respiratory passages. Ether is a powerful stimulant to these organs during the early stage of administration, increasing the rate of inspiration. Evaporating rapidly if given by the open method (which is the most common), the inspired air will be thirty to forty degrees cooler than the air of the room.

Deep inspirations will often carry down into the alveoli some part of each individual inspiration. The effect of the anesthetic being irritant, we find the so-called "death space," that is, between the mouth and the larynx, becomes swollen and secretes a quantity of mucous and saliva, which from experiments with colored particles are frequently seen to be drawn down by the deeper inspirations into the depths of the lung and even into the alveoli. The bronchial tree itself has its epithelia chilled, becomes congested and in numerous cases, if not in every one, petechial hemorrhages are found in the bronchial ramifications, or even in the alveoli.

Every prolonged ether narcosis is followed by small pneumonic foci in the lungs with mucous and extravasated blood cells in the alveoli, and some round cell infiltration. In the predisposed or susceptible this may occur after a shorter operation. With chloroform, which is less irritating and does not produce as cold a vapor on inhalation, these same lung changes are found to a less degree.

The anesthetic forms unstable compounds with the proteids of the blood. The narcotic action is dependent upon a solubility in the blood, stability of that combination and rapidity of penetration of the cells of the body, particularly of the lipoids of the nervous tissue. This combination in the blood is not a chemical one.

The objective effect of a narcotic as seen by the surgeon is that of slumber, but it must be remembered that while the narcotic agent is acting upon the nervous tissue, it is at the same time having some effect more or less deleterious to other tissues of the body, and according to concentration to the duration of anesthesia, and to the metabolic sensitiveness of the different tissues of the body to the agent do we have primary or secondary tissue disturbances.

Let it be understood that with all anesthetics and with every body anesthesia is a toxic process. Fortunately, nature's recuperative powers are so sufficient that damage done to the respiratory tract, the glandular organs and to the brain by the anesthetic is generally followed by complete repair.

Whether ether or chloroform be given some degeneration of the cells of the liver, kidney and tissues of the heart occurs, although to a much minor degree with ether than with chloroform. In the body ether splits up into substances which are not foreign to it, while chloroform splits up into chlorin bodies which are intensely toxic. Particularly is this the case if the anesthetic is given in a room where gas is burning.

The toxic effect of ether is generally exerted on the respiratory system, inducing pulmonary edema,

post-operative pneumonia, or upon the renal, inducing fulminating nephritis, all of which occur immediately after operation. The effects of chloroform are more prone to be metabolic, degeneration in the glandular organs are sustained, and may not produce their symptoms or demonstrate their dangers for several days.

From one and both we have developed in those who are susceptible that mysterious phenomenon known as acidosis. Acids being formed in the liver or elsewhere which act on the bicarbonate in the blood, the carrier for carbonic acid, eliminating it through the urine, thereby blocking the cells of the tissues of the body by preventing an elimination of the carbonic acid.

The effect of ether upon the heart, as well as that of chloroform, is two-fold: a reflex effect through the irritation of the so-called "death space" and the tissue effect. Ether is largely a stimulant to heart action, increasing its rate, rhythm, and apparently its tonicity, for sometimes murmurs heard before the anesthetic disappear with anesthesia. The effect of ether upon the vasomotor apparatus is stimulating, as arterial pressure will rise and be maintained at a proper level for a considerable time. Chloroform, on the contrary, depresses heart action, lowers blood pressure and is a direct arterio-capillary sedative. Those who operate upon the brain will turn from ether to chloroform, if they find much oozing, in order to depress circulation and make the operation easier.

In giving the anesthetic three things must be considered and kept in mind: we must have a mental picture of exactly what is or may be going on in the air passages, in the glandular organs of the body and in the brain while we are narcotizing each individual case. We must know our patient (and this can only be obtained by a preliminary study of the person by physical examination and study of the disease or lesion to be operated for; and, lastly and important, the potential value of the carbonic acid on the system.

Our methods of anesthesia should depend upon the possibility of damage not only of the anesthetic or the way it is given, but also upon the personality of the one giving it. The method which is best, most comfortable and safest, unfortunately, is one which should be confined to the specialist. We have no "jitneys" in anesthesia yet. No quick, rapid transit, safety last methods which are safe. The young man, the interne, the occasional administrator of an anesthetic, should confine himself to that which is the simplest, because in his hands it will be the safest.

If the day ever comes when no one shall be

allowed by law to give an anesthetic until he has been to a school, studied and practiced under a competent specialist, then we can say to the interne that there shall be but one method, which, as we see things nowadays, is the combination of gas, oxygen and ether. Gas is practically non-toxic. Oxygen prevents over-carbonization; that is, suffocation of tissues, and a little ether renders a stability to the narcotic phenomenon.

But until such time as the ideal can be reached we must depend upon some method which can be put in the hands of the novice and the casual administrator. According to clinical experience, the solution is perhaps ether by the open method: according to the reports of experimental surgery, some method by means of which there may be a certain amount of re-breathing of carbonic acid would meet indications.

As has been said before, statistics are of little value because there are so many things entering into the phenomenon of anesthesia: personal, chemical, and metabolic, that this question cannot be answered by them.

We do know that carbonic acid is an important hormone to the body. Unstriated muscle fibre, cardio-vascular, intestinal, as well as the function of the medullary centres, and the brain itself depend upon carbonic acid. Any method which eliminates it too rapidly from a tissue or tissues will lead to disturbances more or less grave.

Too great a stimulation of the inspiratory centre by ether may produce apnea sufficient to kill. If one will but watch the anesthetist he will note that even though open anesthesia is taught by good surgeons to be the safest and best, the tendency is to throw towels around the gauze and to limit the intake so that now we seldom see anything but a modified open method.

Experience has led all anesthetists to precede every narcosis by an injection of morphin-atropin. The reasons are, the patient comes into the operating room more composed and tranquil, the induction period is shortened, excitement is lessened and perhaps eliminated, more profound anesthesia is obtained with greater relaxation, hypersecretion of mucous and cardio-inhibitory shock are prevented, and, as none of the narcotics employed are ideal, none are without danger, any method which will tend to lessen the amount given adds to safety.

Not only should responsibility to the anesthetist begin before the operation and demand his constant and intelligent attention during it, but he and the surgeon should outline the subsequent care in all distinctness and detail. At no time until recuperation is complete from the combination of the anes-

thetic and morphin should the patient be left to himself. When placed in bed, with pillows under the head and shoulders (if there be no shock), the respiratory tract is elevated, breathing made easier and nausea and vomiting less common.

The typical place to put a patient would be in the open. The next best is in a room with the windows widely open so that the breeze may blow over the face, stimulating the respiratory centres, producing a sense of comfort, and facilitating the discharge of the anesthetic from the lungs. But the patient should be well clothed, covered and tucked in. The feet and knees should be kept warm so that there may be no possibility of chill.

During this stage of recuperation, even though it be lengthy, no effort should be made to arouse, no unnecessary touching of the body or face, no calling by name, or endeavor to obtain attention. The longer one sleeps after anesthesia the better and quicker the resolution. Relatives, friends and those curious should be kept from the room. The nurse and the nurse only should be there.

The main object of this paper, however, is to emphasize the fact that with each and every anesthesia a pathology is instituted, which pathology may in many instances become progressive and lead to distress or dangerous conditions.

A single leper is such a horrible sight that even though he is known not to be more dangerous than a syphilitic, communities will build hospitals and spend an unusual amount of money upon him, while the spitting tuberculous, spreading the disease amongst children, find it difficult to obtain proper accommodation. All because we *see* the leprosy and *do not see* the tuberculosis.

So it is with anesthesia. If we could but see the internal organs straining under the anesthetic perhaps we would feel a greater responsibility.

IF YOU HAVE NOT ALREADY AVAILED YOURSELF OF THE OPPORTUNITY OF SECURING A COPY OF THE AMERICAN YEAR-BOOK OF ANESTHESIA & ANALGESIA YOU SHOULD DO SO AT ONCE. THE FIRST EDITION, INCORPORATING ALL THE ADVANCES IN THESE SUBJECTS FOR 1915-1916 IS BEING RAPIDLY EXHAUSTED. SUCCEEDING VOLUMES WILL BECOME A CUMULATIVE ENCYCLOPEDIA AND YOU WILL NOT WANT TO BE WITHOUT THE INITIAL VOLUME. THE MOST OUTSTANDING AUTHORITIES HAVE CONTRIBUTED THEIR MOST IMPORTANT RESEARCHES.

THE PLACE OF LOCAL ANESTHESIA IN SURGERY.*

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Mr. President and Gentlemen: I think that we are to be congratulated on having the subject introduced by such a sane and sensible paper as Dr. Dickenson has just given on the principles which should govern our choice in the use of anesthetics. I don't think one could very well disagree with anything he said.

I am to speak about local anesthesia, which under some circumstances is valuable.

Whenever we speak and write about local anesthesia, it does not behoove us to forget that general anesthesia, and by general anesthesia I mean ether given by an expert, and experts, I believe, have to be born and then finished by training (for you cannot train a man born without that particular tact and sensitiveness which are essential to the job to make a good anesthetist), is the best anesthesia for the routine of the clinic and in the majority of cases. Faddists on local anesthesia are just as ridiculous as faddists on pacifism or any other line, and make themselves ridiculous to the discerning by the time they waste out of a busy morning by interrupting their operations to inject novocain, and sometimes subjecting themselves to the annoyance of operating upon a groaning, struggling patient.

In spite of the great and remarkable life-saving nature of local anesthesia in a large number of cases in which it is an invaluable resource, we cannot deny it certain disadvantages, although by modern technic it has been amazingly perfected and its usefulness correspondingly extended. In the field of surgery, local anesthesia saves us from the embarrassment of having to render our patient unconscious and later sick at the stomach for the removal of a wen or some such trivial procedure; saves him from the necessity of employing an additional assistant (the anesthetist), and us of having to nurse and entertain our seasick patient in the office or hospital until he recovers from the effects of the anesthetic. The minor operations may be done quickly, simply and comfortably, and the patient may walk home at once.

Familiarity with the technic of local anesthesia is for these cases of the greatest value both to the surgeon and to his patient. Here the advantages entirely and unquestionably outweigh the disadvantages.

From its application in minor surgery, many sur-

* Read before the meeting of the New York and New England Association of Railway Surgeons.

geons have extended the field of local anesthesia as the method of choice to many of the operations of major surgery; hernia, for instance. Now, in many patients hernia may be done very satisfactorily under local anesthesia. But I have noticed many times in many clinics that when operating before an audience, a surgeon—even a skilful one—gets many a grunt and squirm from his patient during the operation, and especially in patients of a nervous temperament, has to put up with constant conversation and interruptions, not always couched in respectful language. I would infinitely rather do an ordinary hernia under local anesthesia than under ether given by a poor anesthetist, as nothing is more disconcerting than constant worry about the patient's condition; but when we can command the services of a skilled anesthetist, why not put our patient to sleep and enjoy the comfort of performing the operation in freedom from interruption and worry; and the blessed privilege of attending strictly to the task in hand?

In certain cases of hernia, however—I mean strangulated hernia, particularly those in which obstruction has resulted in periodical vomiting, often fecal—general anesthesia, even in skilled hands, is an additional danger; vomitus may be inhaled. Under these circumstances, the advantages of local anesthesia greatly outweigh the disadvantages, and by putting up with slight delay and annoyance we may complete our operation with much greater safety to our patient. After we have carefully infiltrated the tissues and opened up the ring, it is not necessary to anesthetize the intestine, which is not provided with special sensory nerves, and may be cut, clamped and cauterized with impunity. Pulling on the mesentery is painful, but with a little care to avoid this we can get through these procedures very satisfactorily and put our patient to bed in excellent condition, untroubled by nausea or mucous secretion in the pharynx, which are inseparable from ether. I have been able to make many resections of the intestine in this way without difficulty. In hernia we are not bothered by that spasm of the muscles of the abdominal wall which makes the performance of other laparotomies under local anesthesia difficult. Any operator of experience knows the value of muscular relaxation in abdominal surgery, and will be unwilling to forego it without reason. This reason alone is sufficient to make ether the anesthetic of choice for laparotomies, pelvic and otherwise; but under certain circumstances even these operations may be done to advantage under local. I have resected the cecum and terminal ileum for cancer, and performed the necessary

anastomosis in a woman of 76 with chronic bronchitis without the slightest difficulty and with the happiest result.

My colleague, Dr. J. C. Hubbard, performed a Cesarean section under local in a woman with diabetes, without shock or difficulty, and mother and child recovered. The baby did not have to be resuscitated, either. We have come to regard diabetes, especially if acetoneuria is present, as an absolute contraindication to ether, after losing a patient from acetoneuria. He began to vomit everything and became prostrated, and perished in seventy-two hours after a quick and simple thigh amputation. In his case we employed an anesthetist skilled in giving gas, and gas and oxygen was supposed to be the anesthetic. When the patient struggled a little in the middle of the operation, a few whiffs of ether were given, with the above result.

By the way, by using novocain, a circular infiltration of the thigh may be done, the sciatic nerve injected, and amputation of the thigh easily gotten away with in these cases. Bier's intravenous novocain is a good resource in operations on the knee and lower leg.

Some one now asks, "Why not use spinal anesthesia in these cases, with its simple and rapid technic and satisfactory anesthesia?"

The reason is that when tropacocain is used and given by the most skilful, a patient occasionally collapses and even dies. Employing spinal anesthesia in an old woman with an intestinal obstruction from cancer and a chronic bronchitis—the patient sitting up to have the anesthetic given, of course—I had the horror of seeing her jaw drop, lips turn white and pulse disappear. It was not considered safe to let her lie down for five minutes for fear the fluid would run up along the canal, and we had to hold her through that length of time. After those awful five minutes we put her down and elevated the legs, and her pulse came back and we finished the operation. As far as my sensations were concerned, she might as well have died. I thought she had. Every now and then some one does die from spinal anesthesia, and on the table. If patients are going to die at all I wish they wouldn't die on the table; it is so hard to explain to the family. So I for one am willing to take a lot of trouble to avoid spinal anesthesia.

Even prostates may be done under local. The two-stage operation is employed. The suprapubic incision is easily done under local, and the enucleation under the excellent anesthesia furnished by injecting the terminal filaments of the cauda equina

through the last sacral foramen: the so-called sacral anesthesia. This is an excellent resource in hemorrhoids and stricture, when for any reason general anesthesia is dangerous or inconvenient.

In operations about the mouth and pharynx the intratracheal tube and intrapharyngeal method have so extended the range of the general anesthetic that local anesthesia is rarely needed; but when it is needed it is perfectly surprising what one can do with it. These miracles are accomplished by the combination of regional anesthesia by the injection of novocain into the second or third division of the fifth nerve at the base of the skull, and local infiltration. I inject them according to Levy and Beaudoin's method, the same that we employ for alcohol injections in trifacial neuralgia.

I suppose you are familiar with the pictures in Braun's work on local anesthesia of patients sitting up and conversing quietly while half the upper jaw is being removed, or some such matter. When I saw the picture I hardly believed it possible, but it can be done. I have with the utmost satisfaction and with almost entire freedom from pain removed half the lower jaw, portions of the tongue and lower lip and the submaxillary, salivary and lymph glands by this method. One aged and arteriosclerotic patient died of pneumonia three days after the removal of half the tongue. If a general anesthetic had been employed this death would have been attributed to that.

It is in operations for goitre that, to my mind, local anesthesia has found its most important field. Simple cysts and adenomata of the thyroid may be removed with the greatest facility under simple novocain infiltration, and I believe that this is the best way to do them. The occasional respiratory difficulties connected with ether in cases where the trachea is deformed and flattened are thus avoided. Intratracheal ether is, of course, to be employed if general anesthesia is to be used at all in thyroid cases; but the local anesthesia is so satisfactory that even in nervous patients it is the method of choice. In the exophthalmic cases, morphin and a little scopolamin given beforehand in carefully graded doses will put the patient into a sleepy, stupid condition, such that simple novocain infiltration is enough to keep him quiet even during a long and difficult operation. These nervous patients have such irritable stomachs that the avoidance of postanesthetic vomiting is of the greatest importance. They are often asleep at the end of a long, hard operation for goitre, and the pulse does not go so high, nor the patients get into that dangerously irritable, nervous, jerky condition that they do under local anesthesia alone; *i.e.*, without the morphin and scopol-

min. I am a firm believer in local anesthesia in operations for goitre.

Another class of case in which local anesthesia has been found invaluable is in resection of the ribs in empyema. These patients are septic, weak and sick. Sometimes the cavity connects with a bronchus, and there is danger under a general anesthesia of pus running up into the bronchus on the other side. In rib resection under novocain, the skin and subcutaneous tissues are infiltrated and divided, and then the intercostal muscles, periosteum and parietal pleura. If this is thoroughly done, the rib cutting does not cause pain. The patient's coughing at once aids in the expansion of the lung. There is no waiting for them to come out of ether before the lung can expand and allow the drainage to be adjusted. In abscess of the lung, extensive exploration of the chest has been successfully carried out and two or three ribs resected and drainage put in without the slightest shock or rise in pulse on the part of the patient; and this in a patient pale, weak and septic, and coughing up dirty, grey, mucopus, full of detritus and fragments of lung tissue. A general anesthetic would have unquestionably increased the danger and difficulties of the operation. In a case of bronchiectasis, the contrast was presented between two attempted operations under ether—which had to be abandoned because the patient became black in the face and was threatened with drowning in her own pus—and the resection of three ribs along a length of six inches under local anesthesia. Who uses a general anesthetic for any form of suppurating in the thoracic cavity is to my mind subjecting his patient to unnecessary difficulty and danger.

Local anesthesia may be well used for operations on the brain in which diabetes, disease of the lungs or other conditions contraindicate general anesthesia. The section of the bone here is not unduly painful, as is the case in rib resection.

I am sure to be asked why I do not use the anoci-association of Crile. For the following reasons: In abdominal operations where I have employed it, generally a little ether has had to be added to the gas and oxygen mixture the patient is inhaling in order to overcome muscular spasm, and I have taken the time and trouble necessary for infiltration and have not avoided ether after all.

In operations for vascular conditions, such as goitre, there is always a little mucous congestion with increased venous hemorrhage, very troublesome in these cases. Also I do not get rid of the troublesome presence of the anesthetist and his mask close to the field of operation. I will admit that sometimes a little gas has to be given during

the deeper dissection of a goitre when the local for some reason is insufficient, but it is only for a few minutes and is not very bothersome.

The infiltration of the skin and subcutaneous tissues in goitre facilitates the dissection of the skin flaps by increasing the interval between the skin and fascia, and if a little adrenalin be added, greatly decreases hemorrhage from the smaller arteries and vessels.

If general anesthesia is to be employed at all in these cases I greatly prefer intratracheal anesthesia.

In the majority of other conditions, for reasons similar to those given above, I prefer to have recourse either to simple local anesthesia, without the addition of gas and oxygen, or else to general anesthesia with ether. Gas and oxygen are often given as a preliminary to ether, in order to save time in getting the patient under.

In tracheotomies for obstructive conditions in the trachea and bronchi, local anesthesia works like a charm and is a great contribution to ease and safety.

There is one class of minor operations in which I prefer general anesthesia to local and that is delicate plastic operations about the eyelids, etc., where the infiltration so blows up and stiffens the tissues that the flaps cannot be easily manipulated or delicately adjusted so as to get the best results.

Finally, in children who are easily frightened and do not cooperate with the surgeon, the field of local anesthesia is much smaller than in adults.

ANESTHESIA IN THE SURGERY OF EPILEPSY AND IN THE CONTROL OF STATUS EPILEPTICUS.*

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Surgery as a therapeutic aid is as necessary in the epileptic as it is in his non-epileptic brother, and therefore we have to consider the use of some anesthetic or anesthetics to assist us in such surgery. This class of patient is subject to the same variety of physical ills as is his normal brother, and he requires similar surgery for the relief of these. He is the victim of appendiceal troubles, gall-bladder disturbances, intestinal conditions demanding surgical therapy, fractures, and the full list of surgical disorders requiring operative interference. He is, as a result of his disease, subject, more so than his normal brother, to injuries of all kinds, and only in special institutions, where every effort is made to carefully supervise the patient's daily régime, is

there any lessening of this risk, and even there, we find a multiplicity of injuries, ranging from a slight lacerated wound to cranial fractures. Following intensive medical treatment, there are various metabolic disturbance, which at times necessitate surgical therapy. As a therapeutic measure, surgery in the treatment of epilepsy has been practiced since the earliest recognition of the disease, and the unfortunate sufferer from epilepsy has been the prey of the surgeon since the earliest times.

A varied list of operative procedures have been in vogue with the surgeon at one time or another, and there are but few epileptics who have not at one time or another during their epileptic life been referred to the surgeon, who fortunately has been able to see the futility of many of the operative procedures which have been recommended.

As for the anesthetic to be used in operations performed upon the epileptic, we believe this to be a matter for individual choice, and as indicated by the condition of the patient. We have used both chloroform and ether in our surgery at the Craig Colony for Epileptics, and our experience has taught us that ether, by the drop method, is very well borne by the epileptic, and the greater number of our anesthetics have been obtained with this agent and method. Chloroform has been used largely in any operative work about the head, and in children, we have found this to be most satisfactory. For the reduction of dislocations, the opening of abscesses, and other work requiring only a short period of anesthesia, we have used the so-called Ether-Rausch. The induction by this method is most rapid and there is a very quick recovery. We have seen no ill results follow upon the use of the method.

In our dealings with this class of unfortunates, we have a peculiar type of mental make-up to deal with, ranging from that of the mentally normal to the egocentric and downward to the imbecile, and we should always keep this fact in mind. We do not find the epileptic patient to be any more difficult to handle on account of his epilepsy, *per se*, than any other class of patient. We do find, however, that the mentally-defective epileptic, not realizing the importance of fully cooperating with the surgeon and his assistants, is very difficult to handle, removing dressings and infecting wounds.

Seldom do we find there to be any increase in the frequency of the convulsive attacks after any operative procedure. On the contrary, the epileptic convulsive attacks are less frequent in their occurrence, this being due, we believe, to the better hygienic care given to the surgical cases both prior to and

*Read during the Joint Meeting of the Interstate Association of Neurologists and Psychiatrists, held at Toledo, Ohio, October 9, 10 and 11, 1917.

following any operative treatment, and not to any effect of the anesthetic.

In only one case in our series, running over a number of years, have we seen a period of mental confusion of the active type, following upon a surgical anesthesia. This occurred in a man aged forty-five years, operated upon for the relief of a large right inguinal hernia. This patient was markedly defective mentally, requiring close supervision at all times, his mental grade being that of a child of about ten years of age. Following operation, this patient had a period of active mental confusion, during which he removed the dressings from the abdomen and opened the abdominal wound, with fatal results. Other than this one case, we have seen no unfavorable results following any surgical procedure, which would be blamed to the fact that the patient was epileptic.

It has not been noticed that the period of induction of the anesthetic state has been increased, and neither is it the rule for us to see a convulsive attack occurring during the period of induction. In the hands of a competent anesthetist we find the induction period to be as quiet and as peaceful as is met with in the case of the non-epileptic.

In fact, we recall but one case in which a seizure occurred during operative interference. This was in the case of a young man, on whom a fenestration of the dura was done. The operation was performed in two stages. At the first, the skin incision was made, after which trephine openings, the latter being connected with a Gigli saw. The wound was then closed and the second operation done about ten days later. At this time, the osteoplastic flap is turned back, and a fenestration of the dura made. At the time of the second operation, while the patient was under light chloroform anesthesia, and the skin wound was being reopened, a mild or incomplete convulsive attack occurred, but all convulsive movements ceased when the anesthetic was pushed to the physiological limit.

It should be remembered here, that all of our anesthetics have been induced with one anesthetic, the one agent being used throughout the operation.

We have used local anesthesia for various operations, both minor and major, including operations upon the abdomen, such as hernias and appendectomies, and have seen no convulsive attacks occur at such times. This may have been due to some psychic influence, or it may have been purely a matter of luck with us.

In the treatment of that condition known as Status Epilepticus and Serial Seizures, we have to resort to some anesthetic in order to control the frequently

recurring convulsive attacks. Chloroform we have found to be the most useful in our hands, and we have always endeavored to bring it into use early in the condition.

The anesthetic state is of great assistance in the treatment of Status and Serial Epilepsy in that it allows of time for other methods of treatment to be carried out, such as the use of colonic irrigations, lumbar puncture, and the administration of Chloral and Bromides per rectum. We have not hesitated to use chloroform frequently in any single case, but either we have been somewhat fearful of owing to the possibility of increasing the ever-present pulmonary edema.

Finally, we wish to make a plea for the epileptic, and would suggest that no operative procedure, when necessary, be delayed or abandoned, owing to the fact that he or she suffers from a convulsive disorder. With the assistance of a competent anesthetist in the operating room, and the tact and good judgment of an intelligent nurse at the bedside, we feel that the epileptic will be found to be a far more amenable patient to handle than he is generally thought to be.

CONCLUSIONS.

1. The epileptic, *per se*, is a good anesthetic risk.
2. Convulsive attacks are not met with when ether or chloroform is used to the surgical limit.
3. Chloroform is a valuable aid in the treatment of Status Epilepticus, and should be used early in the condition, so that other therapeutic measures can be instituted.

SOME OBSERVATIONS ON THE USE OF ETHER-OIL COLONIC ANESTHESIA.*

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It is not my intention to discuss this very important method of anesthesia as an expert anesthetist, but rather from the viewpoint of a surgeon. Dr. James T. Gwathmey of New York City must be given credit for his ingenuity and untiring energy in perfecting ether-oil-Colonic anesthesia. Since writing my last paper on this subject, which was read at a meeting of the Medical Society of Virginia in October, 1915, we have used ether-oil-colonic anesthesia in a number of cases in which we thought this special form of anesthesia was indicated. At present we are using it in all operations on the head and neck, and also in the majority of cases of tumors of the breast, especially when the

*Read during the Fifth Annual Meeting of the American Association of Anesthetists, New York City, June 2, 1917.

patients show signs of fear and dread of the suffocating fumes of ether by inhalation. We have had occasion to operate on several patients who have had an anesthetic administered by inhalation before and often they have dreaded the anesthetic more than the operation. In these cases rectal anesthesia has been especially advantageous and it is interesting to note the comparisons of inhalation and rectal anesthesia made by these patients afterwards. I do not recall a single patient who has not made some laudatory remarks about rectal anesthesia and its superiority over inhalation anesthesia. We have used it now in about one hundred cases, and I am more thoroughly convinced than ever that it has a distinct place in the surgical clinic and a specialty of anesthesia.

In our collection of cases, four have been complete failures. The first one is recorded in my previous report of thirty-six cases. She was a girl about fifteen years of age, a moral degenerate as a consequence of a supposed fracture received in early childhood. She was naturally a very unruly person, and this combined with fright resulted in expulsion of the mixture just as fast as it was introduced. Ether by inhalation had to be given. The other three cases were young children under ten years of age. The mixture was expelled repeatedly by all three of these little patients, although it was given with a small catheter and very slowly. We have found it impossible to anesthetize children under ten years of age by this method, presumably on account of fright and lack of control. We have, therefore, abandoned its use in small children. In twenty cases ether by inhalation had to be administered to complete the surgical anesthesia, ranging in time from a minimum of one minute to a maximum of five minutes. In four cases analgesia was produced, but not complete anesthesia. One was an adeno-fibroma of the breast and the other three were recurrent cancers of the tongue or the lower jaw. In all of these cases analgesia was complete, but the patients would answer when spoken to, the operations lasting from thirty-five minutes to one hour and twenty minutes. The patients did not suffer any pain nor did they remember anything about the operation. In the remaining sixteen of our series were under full surgical anesthesia from ten to thirty minutes from the introduction of the anesthetic. I believe the number we had to supplement with general anesthesia would have been reduced if we had waited a little longer, but as a rule after a surgeon has waited about fifteen or twenty minutes for an anesthetic, the limit of his patience has been reached. Nausea and vomiting was reduced at

least fifty per cent in this series and about twenty per cent had neither nausea or vomiting.

The last case of this series was a Jewess, 40 years of age, who had an epulis about the size of a hazelnut on the lower alveolar process, a little to the left of the median line. This patient was extremely nervous and apprehensive about the anesthetic. She was given the maximum dose without the slightest suspicion that she was being given the anesthetic, and was under full surgical anesthesia fifteen minutes after the second injection. The tumor with the adjacent alveolar process and upper border of the lower maxilla was removed after the Paquelin cautery. The operation was completed in thirty minutes. When the patient reacted, it was hard to make her believe she had been operated upon. She said the last thing she remembered was that she felt sleepy in her bed and when she awoke she was in the same place. She couldn't understand how or when the operation had been done. She was neither nauseated nor did she vomit, and she asked for food immediately after reacting.

The following is the technic we now employ at St. Elizabeth's Hospital:

The patient is given an ounce of castor-oil the night before operation, and saline colonic irrigation three hours before the anesthetic solution is introduced. We used to employ soap-suds enema followed by saline irrigation, but have found from experience that occasionally some of the soap-suds enema would be pocketed in the colon and interfere markedly by partially emulsifying the ether-oil mixture, thereby rendering its anesthetizing qualities less active. We are now using Lathrop's modification of Gwathmey's original technic. Two drams of paraldehyde in a mixture of three drams each of oil and ether is given per rectum; half an hour later $\frac{1}{4}$ of a grain of morphin with 1/100 of a grain of atropin is given hyperdermically; and twenty minutes later, a mixture of two ounces of ether in two ounces of oil is given per rectum in light weight patients, or in those more robust, three ounces of ether in two ounces of olive oil. This mixture is given to the patient while lying in bed on the left side in Sims' position. A small catheter, well lubricated, is introduced from three to four inches into the rectum and is attached to a funnel. The same apparatus and position is used for both the initial and last doses. We always allow from eight to ten minutes for the mixture to flow in. By doing this, there is less tendency toward cramping and expulsion. While the mixture is flowing in, the funnel is lowered repeatedly to allow the escape of gas which the mixture has replaced. Just as soon as all

of the mixture is injected, a wet towel, folded, is placed over the face to retard elimination by the lungs.

The patient is kept on the left side in bed until signs of anesthesia become apparent and is then gently lifted on a stretcher and carried to the operating room. The respirations, pulse and reflexes should be watched just as carefully as in other forms of anesthesia. If there is any cyanosis while the air passages are open, with loss of pupillary reflex, stertor or embarrassed respirations, a rectal tube should be inserted about four inches into the rectum and from one to three ounces of the mixture drawn off, the quantity depending altogether on the clearing up of the unfavorable symptoms. If the breathing is easy and regular, the circulation good, with complete relaxation and active pupillary reflexes, the patient is in surgical narcosis and the operation may be safely started.

After the operation is completed the bowel is irrigated with cold soap-suds solution until the return flow is clear. Abdominal massage is performed over the course of the colon to facilitate expulsion of the mixture. The soap-suds irrigation is used because it emulsifies the ether-oil mixture and makes it easier to wash out. Three ounces of warm olive oil are then injected and the tube withdrawn. I believe the warm olive oil injection is very important, because I have heard of several cases of proctitis following ether-oil anesthesia when the olive oil was not used. We have used it in every instance, and not a single case of proctitis or rectal discomfort has occurred in our series of one hundred cases.

The patient is carefully returned to bed in a darkened and well ventilated room. Cold saline enemas are given every four hours and abundant water is ordered. Convalescence, so far as the anesthesia is concerned, is uneventful as a rule, any number of cases having neither nausea or vomiting and when it does occur, about 50 per cent. less than by other methods.

In conclusion, my observations summed up briefly are:

(1) I do not recommend ether-oil anesthesia as a general routine anesthetic because it is a slow procedure and requires a great deal of preliminary treatment and after treatment.

(2) Colonic anesthesia has a very important place in surgery and anesthesia and distinct advantages over other methods in many operations.

(3) It is the anesthetic of choice in all head and neck operations.

(4) It is the safest anesthetic in bronchial diseases.

(5) A more even plane of anesthesia is maintained and the patient is not in and out of anesthesia as sometimes occurs in the inhalation method.

(6) There is less irritation to the kidneys and lungs, a comparative urinalysis bearing out the former, and clinical symptoms the latter.

(7) It is the ideal anesthetic in highly nervous individuals, especially those suffering with exophthalmic goitre.

(8) It is not recommended in young children.

(9) Nausea and vomiting are reduced at least 50 per cent.

(10) It more nearly approaches natural sleep than any anesthesia I have yet seen administered.

DISCUSSION.

DR. WALTER LATHROP, Hazelton, Pa.: It is a pleasure to appear again before this distinguished gathering of expert anesthetists, and to have the privilege of saying a few words on the subject of colonic anesthesia.

I am only speaking from the standpoint of a surgeon, and from my personal experience in some four hundred (400) or more consecutive cases in which this method was used.

The more I have it given, the better I like it, in those cases where it is indicated. In head and neck operations, it is ideal, and anyone who does much goitre surgery, need only use it a few times to be a convert to the method.

To the high strung, nervous, apprehensive woman, it offers the best method of nerve calming, before operation, of any means I know. The woman or man with exophthalmic goitre can be anesthetized, operated upon, and returned to bed with very little realization of what took place. In bone work, such as inlay graft, or suture, it is ideal, for the patient will remain quiet, and free from pain for a considerable period, thus permitting the dressings to become thoroughly fixed, and the possibility of displacement by muscular action is lessened.

Dr. Gwathmey deserves much credit for his work along this line, and he has awakened enough spirit of investigation in others to guarantee the method a fair trial.

I have seen no dangerous symptoms as yet; we have had none of the bowel irritations, mentioned by some writers, *whose technic must be faulty, or their preparation wrong*. We are using less ether than at first, and less oil: We now use in average cases, three ounces of ether, and one ounce (or $1\frac{1}{2}$) of oil. *The bowel should be well cleansed by at least two enemas*. The preliminary treatment should be given about forty minutes before the

mixture. Our regular routine is to give two and a half drams of paraldehyde, one half ounce ether, and three drams olive oil (thoroughly mixed), at least thirty-five or forty minutes before operation; a hypodermic of 1/4 gr. morphin and 1/150 gr. atropin is also given at this time.

The mixture of ether-oil is given about ten minutes before operation, or forty minutes after the hypodermic. It should be introduced slowly—an ounce per minute, and we sometimes use a few drops of anesthesol in those cases who are at all restless, when the knife is first used—this is not common, but does occur in a small per cent. of cases, and it requires but a few drops to complete the stage of sleep desired. *The bowel is thoroughly flushed after operation.* A pint, or less, of plain water, or water with sodium bicarbonate added, is left in, and the patient returned to bed. Vomiting occurs in a smaller number of cases than after inhalation anesthesia. The method deserves use in *selected cases.*

ANESTHESIA AT THE FRONT

In order to give the readers of the Supplement some knowledge of what is doing in anesthesia at the front, the editor has gone over the more recent literature to secure facts and is herewith presenting the accumulated data from authoritative sources. In a personal interview with Col. T. H. Goodwin, R. A. M. C., of the British War Mission, and Col. Charles Dérle, of the French War Mission, during the recent meeting of the Interstate Anesthetists at Toledo, Ohio, the editor was impressed with the fact that these authorities, both of whom have served with outstanding merit since the beginning of the war, wanted only all-around physicians and dentists as anesthetists at the front. The pace is terrific, the skill required exceptional and the demands exorbitant, so only the most perfect physically and the most highly qualified can deliver the goods. It is a man's job. Aside from giving anesthetics, during intervals of comparative calm, the medical and dental anesthetist is called upon to cooperate with the medical, surgical and dental staff, and in that capacity he must be proficient in all lines of practice. During the heat of engagements he must be qualified to accept responsibility and take the initiative should emergency so require.

The surgeon general, so far, has given the rank of first and second lieutenant to the anesthetists enlisting in the Medical Reserve Corps. It is understood that some who have seen six months' service will be advanced to the rank of captain. In this connection it is of interest to note that the most noted and experienced American anesthetists are entirely outranked by their English confrères, who are mostly captains, majors and some even lieutenants-colonels. Nor has the British army suffered by according such rank to its anesthetists. They are specialists on a par with the physicians, surgeons and dentists in other specialties, their work is just as important and the good of the service can best be secured by proper rank. It is to be hoped that the Surgeon General will shortly act, through Congress, in securing proper promotion for the entire medical service of the army. Meanwhile the anesthetists are in the war to a finish and may be depended on to do their part.

The following excerpts speak for themselves:

SIX MONTHS' ANESTHETIC SERVICE AT A CASUALTY CLEARING STATION ON THE SOMME.

MAJOR CHARLES CORFIELD, R.A.M.C. (T.F.), M.R.C.S.,
L.R.C.P.

Assistant Anesthetist, Bristol General Hospital.

Probably no medical unit in the army has a stronger claim for skilled anesthetists than Casualty Clearing Stations. I was attached to a C. C. S. as special anesthetist, and it may be of interest to give some account of my experiences during the following six months.

On arriving at the C. C. S., I found the usual anesthetic equipment, viz., chloroform, ether, ethyl chlorid with Schimmelbusch masks. I added to this by indenting for nitrous oxid and apparatus, and fortunately was able to procure them. From my point of view, patients were divided into two classes, those necessitating a short anesthesia, up to 10 or 12 minutes, who were given nitrous oxid, and those requiring a longer period, who were given chloroform and ether. The first class comprised wounds to be cut out and dressed, foreign bodies removed and guillotine amputations, and for such cases nitrous oxid was used. The advantages were both a saving of time and of labor. Time was saved, because the period of induction and returning consciousness were a matter of seconds, rather than minutes, and labor was saved because most of these patients could walk back to their own wards, either by themselves or with the help of one orderly; whereas chloroform or ether would have meant that every case would be a stretcher one.

For prolonging nitrous anesthesia, one had to use a gas and air mixture. My method was to get them deeply under, and then push back the air valve for a quarter to a third of an inch, so that the patient would get sufficient oxygen to keep him from asphyxiation. Patients varied in the amount they required. It was, one might say, a compromise between color and consciousness; with too much air, they became sensitive to pain, and with too little air they became cyanotic. Occasionally, one came across a patient who was difficult to keep under, because of clonic spasm and rigidity, and, in my experience, nitrous oxid is always a difficult anesthetic to give unless the patient can be lying on his back.

I never had any vomiting after this anesthetic, and I daresay most of the patients had a stomach fairly full of food. The condition of the bladder is important, and as so many patients voided their urine while under nitrous oxid, a bottle was given them as a matter of routine immediately before.

I find on referring to the records that average time of this anesthesia was seven to eight minutes, the longest period being 21 minutes. As far as I could roughly calculate, the amount of nitrous oxid used was at the rate of about four gallons a minute.

Nitrous oxid cylinders take up a considerable amount of room. Cylinders carelessly screwed on to the stand lost half their contents by leakage. I, therefore, always fitted them on myself, and tested the joints under water afterwards. I found that greasing the screw-thread with vaseline, and having the cylinder nozzles cleaned of grit and dirt were very effective in making them screw up and so fit accurately. Washers I always cut from a large size drainage tube, and renewed them every time the cylinder was changed. Occasionally, a 100-gallon cylinder would be sent, and as this would not fit the stand, the india-rubber tube connection was screwed directly on to the nozzle and man-handled by a key. This entailed an extra orderly, and so such cylinders were kept for slack days.

We were fortunate in having a dental surgeon with us, who soon picked up the technic of prolonged nitrous oxid administration. In the busy times he proved a valuable help, giving me an opportunity of dealing with the more serious cases and those requiring considerable surgical interference.

In this work, my routine anesthetic was ether, preceded by chloroform, on a Schimmelbusch mask.

My method of covering the mask was to have an inside layer of lint covered by four or six layers of white gauze.

(Continued on page 36)

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA and ANALGESIA

Surgery Publishing Co.

J. MacDONALD, Jr., M.D., President and Treasurer
92 WILLIAM STREET - NEW YORK, U. S. A.

Original Articles, Clinical Reports and Experimental Researches on the Theory and Practice of Anesthesia and Analgesia, as well as pertinent Society Transactions, are solicited for exclusive publication in this Supplement. Typewritten Manuscripts facilitate Editorial Revision and avoid errors.

Subscribers Changing Address should immediately notify the publishers of their past and present locations.

Half-tones, Line-etchings and other Illustrations will be furnished by the Publishers when Photographs or Drawings are supplied by the Author.

F. HOFFER McMECHAN, A.M., M.D., Editor
Avon Lake, Ohio, U.S.A.

JANUARY EDITORIALS. 1918

ANESTHESIA, ANESTHETISTS AND THE WAR.

It was recently brought to the attention of the EDITOR of the SUPPLEMENT that a prominent western surgeon, who was organizing a Base Hospital Unit for active service, contemplated the use of enlisted men as his anesthetists. The idea that men who never before in their lives have had an ether can in their hands and have never seen the inside of an operating-room can be momentarily transformed into anesthetists is a mistake in judgment bordering on criminal negligence.

England, which for years has given the licensed and qualified anesthetist his just due, has made its anesthetists lieutenants, captains and lieutenant-colonels in the army medical corps, and Lord Northcliffe in a personal communication writes that after his nine visits to the front he is convinced that the anesthetist is one of the most important medical factors in the war.

When one stops to realize that the army surgeon of today is expected to handle on an average of seven operative cases an hour during the heat of action, it is palpably apparent that he cannot measure up to this standard of speed without the most expert assistance on the part of his anesthetist, orderlies and nurses. Nor can the anesthetist under such conditions be a tyro unless the service of the whole surgical staff is to collapse.

The Surgeon General, the Red Cross and Council

of National Defense have seen fit to recognize officially the services of every specialty in medicine and surgery, except anesthesia, and yet, since the very outset of hostilities in 1914, the anesthetist has been one of the mainstays of the surgical service in the casualty stations, evacuation and base hospitals and the rehabilitation centers in blighty.

Official recognition is apparently being held up by the efforts of some surgeon to handle the entire anesthetic service in order to gain some passing notoriety or secure some personal advertisement or advance some individual methods.

The specialty of anesthesia has had its sections in the International Congresses of Medicine and Dentistry for years; the erstwhile London Society of Anesthetists is now the Anesthetic Section of the Royal Society of Medicine; while here in the United States the American and Interstate Associations, the New York, Providence, Louisville, Indianapolis and other societies of anesthetists have placed the specialty on an enviable footing.

The Organized Anesthetists have been appealing to the powers-that-be to extend the specialty official recognition and utilize the available anesthetic resources of the country in the present war emergency, but such recognition and mobilization is being delayed and presently there will be the same ghastly cry go up in this country that has gone up in England so often: "Too Late!"

The Organized Anesthetists are proceeding in the mobilization of their specialty awaiting the call of distress from those in authority. When it comes they hope to meet the emergency, although it would be far easier to do so in advance.—McM.

TO THOSE IN SERVICE.

The Editor of the Supplement would be pleased to hear from all those who are in active service or who have applied for commissions. The Supplement wishes to keep in touch with those who are responding to the Call to the Colors so that such service may become a matter of record in the annals of the various associations.

In this issue of the Supplement the Editor has begun the collation of data regarding Anesthesia at the Front. That this Department may serve its purpose those in active service are invited to keep in touch with the Editor and send him such observations on their work as may be useful in preparing others for service. A new chapter is being written in anesthesia and those who are participating in any phase of war surgery should not hesitate to contribute their bit of knowledge and experience.

ANESTHESIA AT THE FRONT

(Continued from page 34)

The ether, when drawn on, soaks quickly through the gauze and gets into the nostrils. It covers the face and the gauze itself, in its cellular texture, enmeshes sufficient warm air from the patient's rebreathing to prevent the whole thing from getting very cold. Before beginning the anesthetic, I dropped about a drachm of chloroform on the inside of the mask, then holding it an inch or so above the patient's face, quietly talked to him and asked him questions. During this time, usually about a minute's duration, the mask would be lowered till it rested on the patient's face. Then ether was cautiously dropped on, gradually increasing up to saturation of the mask as it became tolerated by the respiratory tract. I then placed the corner of a towel, four fold, over the mask to conserve the warmth and increase concentration. By this method, I rarely got the slightest movement on the part of the patient, and he was generally ready for the operator in two minutes from beginning.

This method of giving chloroform means a high percentage at what is supposed to be the most risky period of anesthesia, and is for this reason against the orthodox teaching on the matter. However, during my six months' work, I never had a fatality, or, indeed, any case in which this method gave me anxiety. It had the merit of speed; two minutes, as I have said above, being the usual time to induce complete anesthesia, a record I have never been able to achieve with open ether alone. In cases in which it was possible, I gave a preliminary dose of omopon an hour before the operation. The advantages of hyoscin, morphin and atropin for this purpose are common knowledge, and I need not dilate on the method beyond saying that it was particularly useful with us, for it kept patients quiet two or three hours after they had got back to the ward, and so saved the attention of a nurse or orderly.

I was always in favor of patients who could swallow at all having a pint of hot tea while waiting for operative treatment. It has the advantage of stimulating and warming them, they always like it, and it is a very effective *transfusion* too. Being liquid, even if vomited, no mechanical obstruction to respiration is likely to result.

It is a curious thing that in many patients who have had a meal just before they were wounded, the process of digestion or, at any rate, of stomach movement, is totally arrested, and they will often vomit food 10 or 12 hours after they have taken it. I remember one patient who, in the first stage of anesthesia, started to vomit violently, and brought up three bowlfuls of bully beef and biscuit. By the time he had finished he was fully conscious again, and I found out from him that he had had this meal 28 hours before, and had been wounded two hours after it.

I was fortunate during my six months' experience in having only one patient die on the table. He had a wound of the diaphragm on the left side, it being partially torn away from the costal attachment. He started with a fairly good pulse, which continued for half an hour, and then gradually got back; he died in the course of 10 minutes. He was having open ether, and I think death was no doubt due to the abdominal condition.

One case, with considerable damage to the mouth and lower jaw, stopped breathing during anesthesia, and a laryngotomy was done. It was found that a large blood vessel had been torn through. He lived and did well. This patient, with his jaw being so badly injured, was given the intratracheal method, and I think another time I should adopt it, or, failing that, a preliminary laryngotomy.

I must, before concluding, mention the fact that some weeks before I left the C. C. S. I had a Shipway war-ether apparatus in use, casualty clearing stations having been supplied with them. In theory, any effort to conserve the body heat of a patient seriously injured, must be an advantage and for that reason, the Shipway apparatus justifies itself. I think, too, it is more economical of ether

than the open method on a mask. But apart from these considerations, I have not been able to satisfy myself that it has any overwhelming advantage over the drop-bottle and mask. It is more cumbersome, and I find the bellows very tiring for the hand. A foot-bellows would obviate this, and might be added at very small extra cost or weight. Probably, with a larger experience, I should think better of this apparatus, and the authorities, at any rate, are sufficiently impressed with its advantages to send it to each of the hospital units in the field.

This article has been written in England, while home on sick leave, without the aid of notes. It is, therefore, culled from memory and has no statistics.

A METHOD OF ANESTHETIZING SOLDIERS.

W. J. MCCARDIE, B. A., M. B., B. C. CANTAB.,
CAPTAIN R. A. M. C. (T.).

Anesthetist to the General, Dental, Ear and Throat Hospitals, Birmingham, and to the West Bromwich District Hospital.

I have long noticed that when coughing occurred during the early stages of etherization a change for a few minutes to chloroform stopped the cough and much lessened mucous secretion. The small quantity of chloroform inhaled exercised apparently a prolonged mitigating effect on the irritating quality of the ether. It seemed to me, therefore, that if the short interval of chloroformization had such a prolonged effect it might be worth while to try the addition of a small quantity of chloroform to the ether in Clover's inhaler, with the object not only of lessening irritation, but also of obtaining an anesthesia more nearly approaching the ideal—that is, a sleep-like one. Since chloroform acts as a depressant, but ether as a stimulant, it should be possible to obtain by a mixed vapor of these two drugs an anesthesia in which, while there is a proper muscular relaxation, the respiratory and circulatory functions are neither depressed nor stimulated but approximate to their condition during sleep. Such a mixture would probably differ in its proportion according as to whether the open or closed method were used, and also according to the type of patient, if the best results were to be obtained. Perhaps the best all-round mixture would be one in which the respiration and circulation are very slightly stimulated by the addition of a little more ether, thus ensuring safety and counteracting any shock arising from the operation. The idea is to take ether as the standard of safety and so to dilute or modify its action as to obtain some of the advantages of chloroform anesthesia. Ether thus modified by chloroform, as suggested later, possesses practically the safety of pure ether. When we use such mixtures as E_2C_1 , E_3C_1 , we regard chloroform as the main drug and modify its action by the addition of ether. It has been shown of late years that the mixing of chloroform with ether enhances the anesthetic power of each drug; indeed it has been asserted that a mixture of six or seven parts of ether with one part of chloroform increases the potency fully 30 per cent. without increasing the toxicity.

Having at the First Southern General Hospital, Edgbaston, the opportunity of anesthetizing soldiers—that is, patients of much the same age and type, and trained, fed, and living under the same conditions—I tried the effect of different mixtures of chloroform and ether administered by the closed method from a Hewitt's wide-bore modification of Clover's inhaler. To soldiers a routine method seems particularly applicable. They are mostly strong and fit men, well fed, much accustomed to tobacco and consequently with irritable throats; nearly all have coughs due to exposure to wet and cold indoors and out; their nervous system is on a much higher plane of tension than that of the normal individual during ordinary times, so that altogether as a type they are much more difficult patients in whom to induce anesthesia than are the general run of those met with in civil practice. On the other hand, when once induced, anesthesia is maintained in them more safely and easily than in the ordinary non-military patient, because, generally speaking, of the healthy conditions in which the former have been living. In fact, soldiers more nearly approach the normal healthy human being than does any other class of patients.

At the end of October, 1915, I began to use various mixtures of chloroform and ether in Hewitt's wide-bore Clover's inhaler, beginning with mixtures of E_2C_1 , E_3C_1 , $E_{4.5}C_1$, $E_{6.5}C_1$, $E_{8.5}C_1$, $E_{10.5}C_1$, by a volume.

In the first three of these mixtures the chloroform factor predominated too much for safety, causing blueness and too quiet respiration, whilst in the last one the ether component predominated too much, and the effect of the chloroform was practically negligible. Finally, in $E_{8.5}C_1$ I found a mixture which suited admirably my purpose, and have used it in more than 1,200 cases. Since the above-mentioned date it has been my routine method for the induction and often for the maintenance of anesthesia. The $E_{8.5}C_1$ and $E_{10.5}C_1$ mixtures I found very useful for debilitated patients.

In 1916 I administered $E_{8.5}C_1$ to 732 out of 843 cases at the First Southern General Hospital—that is, to practically 7 out of 8 patients.

I look upon it as and call it *mitigated ether*, and administer it exactly as I should ether by the closed method, the only difference being that during induction I very often allow one or two inspirations of air.

The respiration and circulation are slightly stimulated, the patient is of a good color, respiration being about half as deep as that during pure etherization. There is much less irritation of the respiratory mucous membranes than with ether alone, but if much coughing ensues during induction, as so often happens in soldiers, I immediately change down to a mixture of chloroform and ether, or more commonly to chloroform alone given by the open method. In fact, in the last few months, in nearly all operations which last longer than a few minutes, save rectal ones, after induction of anesthesia has been safely brought about and some degree of stimulation of the vital functions established, by $E_{8.5}C_1$, I change down to chloroform and find it best suited to maintain anesthesia.

The contraindications to the addition of the small amount of chloroform to the ether are cases in which the fullest stimulation by ether is needed, as in patients in whom there is great shock, loss of blood, or toxemia, or where rapid dilatation of a sphincter or stricture is necessary.

As compared with pure ether, administration of $E_{8.5}C_1$ by Clover's inhaler causes less irritation, less muscular spasm, less mucous secretion, less excitation, and less obnoxious smell. The induction of anesthesia is quicker and quieter and muscular relaxation appears more quickly and is more complete. The addition of this small amount of chloroform seems to make a very great and advantageous difference. The $E_{8.5}C_1$ may easily be given without any preliminary administration of nitrous oxide or ethyl chlorid.

All soldiers have a preliminary intramuscular injection of morphin 1/6 of a grain, and atropine 1/100 of a grain, as nearly as possible half an hour before the time of operation, so that the maximum effect of these drugs is obtained. This injection is essential for quiet induction and stoppage of secretion. The effect of the morphin helps greatly to quiet induction and to maintain and steady the anesthesia. It also enables a lighter form of anesthesia to be used than is possible without it. The disadvantage of the morphin is that very occasionally, owing to the light respiration, the patient may become a trifle bluish under chloroform.

Since 1901, when I first used it by the closed method, I gave ethyl chlorid as a preliminary to etherization, but since administering "mitigated ether" it occurred to me that a better preliminary would be a few drops of a mixture of two parts of ether and one part of chloroform dropped into the bag of the inhaler, just as is ethyl chlorid. At first I used to drop the mixture on to a little wad of wool fixed in the angle piece to which the bag is attached, but I soon found it better to spray directly into the bag 15 to 20 drops (not minims—2½ drops are about equal to 1 minim) of $E_{8.5}C_1$. This quantity seems to be equivalent to the usual dose of 3 c.c.m. of ethyl chlorid. The few drops of this mixture do not volatilize so quickly as does ethyl chlorid, the vapor does not surge into the head so rapidly, and the transition from the one mixture of chloroform and ether to another mixture of the same components seems somewhat easier, quicker, and smoother than from ethyl

chlorid to ether or to *mitigated ether*. The small quantity of mixture so administered is far less costly and more convenient than ethyl chlorid, and I now use it before giving ether in private work.

With regard to the course of anesthesia during the administration of $E_{8.5}C_1$, I have had two cases in which respiration ceased, in one of which the fault was due to inadvertence. In both cases the pulse and color remained excellent, and respiration quickly restarted after a few compressions of the chest. Otherwise I have had no danger or trouble.

With regard to lung troubles I have had four cases of pneumonia and two or three of bronchitis.

All these patients had morphin 1/6 gram and atropin 1/100 gram before anesthesia, and had no mucous secretion; therefore there was no question of inhalation of septic material from the mouth.

Two other patients had a good deal of bronchitis afterwards. There was no prolonged sickness after any administration. It is very probable that in no case was the lung trouble wholly, or even partly, due to the anesthetic, because the patients had to be transferred after operation along draughty corridors to wards which were also sometimes draughty and cold, and were never intended for hospital use.

In the pressure of present-day hospital work rapid induction of anesthesia is necessary. The method described is all round the quickest and least unpleasant one I know, and is practically as safe as the more usual sequences of gas and ether or ethyl chlorid and ether. Refinements and time-spending methods of administration, such as gas and oxygen, intratracheal anesthesia, open ether *ab initio*, percentage inhalers, have little scope and less efficiency, when applied to tough fighting men, in the routine of a big and busy hospital. Safe, simple, and speed methods are the most valuable.

CONCLUSIONS.

1. The irritation caused by ether vapor administered by the closed method is much mitigated by the addition of a very small quantity of chloroform.
2. The addition of this small amount of chloroform to ether distinctly saves the work of the lungs and heart, which during a long or severe operation may be a very important factor.
3. The mixture is practically as safe as the administration of ether alone, because the ether greatly predominates.
4. It is valuable as a routine method of producing anesthesia in soldiers, being reasonably safe and rapid.
5. A few drops of $E_{8.5}C_1$ are preferable to ethyl chlorid as a preliminary to the administration of ether, or $E_{8.5}C_1$.
6. For maintenance of anesthesia $E_{8.5}C_1$ or chloroform are preferable to even *mitigated ether*, owing to the prevalence of respiratory irritability among soldiers.

PROPER RANK FOR AMERICAN ANESTHETISTS.

In a personal communication First Lieut. James T. Gwathmey writes as follows:

"I have been to the front with the French and also the British and expect to go to a casualty clearing station again with the British very shortly. Nitrous oxide-oxygen and ether is the only anesthetic for this kind of work as *speed* is the only desideratum. I have given as many as thirty-four anesthetics myself in one day—something that would be impossible with chloroform or ether.

"American anesthetists at the front are placed at a very great disadvantage as far as the men with whom they are thrown are concerned. Most of the English army physicians giving anesthetics have the rank of captain, some are majors and a few even lieutenant-colonels. Would it be possible for you to help correct this matter by writing to Surgeon General Gorgas and urging him to rank American anesthetists, at least on a par with their English associates in the same specialty.

"All the medico-military men at the front are here to stay until this thing is over and Fritz will have received the licking that is due him. Over here it looks as if the war will be over by this time next year, even if the Germans manage a separate peace with the Russians.

"Chloroform anesthesia should be prohibited absolutely

as the terminal anesthetic. Ethyl chlorid should also be unknown in civil life, and sink rapidly under the anesthetic. We should limit ourselves to ether, nitrous oxid-oxygen or a combination or sequence of these anesthetics and only use the C-E mixture as an induction anesthetic.

"Aeroplane are the things that will end the war, and if America can supply enough of them this in itself will be the biggest single factor in winning a decisive peace, as any one can testify who has been *bombed*!"—General Hospital No. 9, Lakeside Unit, B. E. F., Rouen, France.

FOREIGN ETHER—CHLOROFORM AND ETHYL CHLORID—ANESTHETIC SERVICE.

In a personal communication First Lieut. Arthur E. Guedel writes as follows:

"I am beginning to understand why ether in Europe has been so slow in displacing chloroform. The ether they are using here is *rotten*. It is not much better than our wash ether at home. It is difficult indeed to put a patient to sleep with it, to say nothing of securing a quiet state of anesthesia. From the coughing and great quantities of mucous secreted it would seem to contain more sulphuric acid and formalin than anything else. Also it is about as volatile as alcohol. You never get any frosting on the mask. Usually a patient will walk right out from under anesthesia with this ether in spite of continuous administration, and a clean mask becomes soggy and useless after about ten minutes.

"Whether or not this ether is the usual European ether I am not certain, but from many inquiries that I have made I am led to believe that it is. They say over here that it requires a very skillful man to give ether, and take it from me it does. I have not been able to get by with it (with this foreign ether) and I have failed to see anyone else do it.

(This verdict is supported by Dr. R. H. Ferguson, who on his European tours demonstrating the drop method of etherization always carried his own supply of American ether. It is also interesting to add that very soon after the advent of Major Grayson P. Murphy, of the Red Cross, in France, he cabled home for 100,000 half-pound tins of ether and paraphernalia and operatives for a gas-oxygen plant.—Ed.)

"Their chloroform and ethyl chlorid are all right and most of the anesthesia here is accomplished with these agents. I have come to the point that, with all my anti-chloroform prejudices I am using chloroform in all cases when I cannot get *American ether*. For the short anesthetics I use ethyl chlorid on an open mask and like it. Nitrous oxid here is almost out of the question. I understand Major Crile brought a lot of it over for the Lakeside unit, but I do not know of any other available source here at our part of the front. A number of units have gas apparatus, but at present *nothing to use in them*.

"It scares me green to see the way they pour on chloroform here. They use it about as we do ether back home. They don't seem to fear it at all, but that may be because of the extremely low price fixed on human life in this war. They have their accidents, of course, but seem to think them infrequent.

(In this connection it is of further interest to note that M. Quenu and M. Reymer, two of the most prominent surgeons in France, the latter also a noted anesthetist in his day, have been debating the question as to whether a wounded soldier can be compelled to undergo an operation under chloroform anesthesia under penalty of minimal pension from the consequent disability. The former maintains that chloroform is so dangerous that soldiers cannot and should not be coerced, the latter maintains that chloroform is comparatively safe and the whole problem has been submitted to a special Committee of the French Government for solution.—Ed.)

"As for anesthesia in the American army this should be given some general attention by all means, by the United States authorities. As it is the methods are slipshod and careless to a degree that causes an enormous wastage of anesthetic material and occasional accidents

which are costly to the government, to say nothing of the occasional life of an American soldier. As it is the surgeon, no matter what his experience or rank, has full control of the anesthesia for his cases and as a rule he knows nothing of anesthesia. With such surgeons the co-operation of skilled anesthetists is a secondary consideration.

"This matter should be and could be regulated to the great advantage of all concerned. A system of suggestions and instructions to the medical corps of the army in general, based upon observations of the needs of this particular war in the matter of surgical anesthesia, would go far toward saving money, time and life. Don't you suppose it possible to bring about some official consideration of anesthesia in this war? It is certainly badly needed. Every scientific branch of service in the army at this time is advancing except anesthesia and that is still regulated by rule of thumb. Give it some thought yourself. If you or Dr. MacDonald could do anything to help the conditions and better them, it would surely be worth while.

"This army life over here is pleasant enough in general. I have been here now for several months with the Mackey-Roosevelt Base Hospital Unit and we are beginning to get busy. Most of our patients, so far, are French soldiers who are sent down from a sector of the front where they pull-off a periodical drive." (Mackey-Roosevelt Base Hospital Unit, American Expeditionary Force, France).

WORK OF THE SURGICAL TEAMS AT CASUALTY CLEARING STATIONS

Major Kellogg Speed writes the following to the Journal of the American Medical Association:

"In addition to administrative officers, etc., there are assigned to each Casualty Clearing Station surgical teams, composed of picked men of surgical ability, *each supplied with his own anesthetist*, operating nurse and orderly. These teams divide the major and minor surgical patients in rotation as fast as they are able to finish each operation. Team work is divided thus: Each team works for 8 hours a day, except during rush times, when they are expected to do 16 hours duty. Three teams are on duty from 9 a. m. to 5 p. m. in the major theater, using 5 or 6 operating tables; two teams work from 5 p. m. to 1 a. m. and one team from 1 to 9 a. m. under ordinary conditions. The work is continuous as long as the hospital is taking in. Teams cease to take on patients one-half hour before the expiration of their time so that their table may be cleaned and prepared for the next group.

"The major operating theater is centrally located; the minor theater is near the dressing tent. All are electrically lighted. *The arrangement of five or six tables in the major theater permits the anesthetist to move from patient to patient in advance of the operator, while dressing and splints are being applied or the operation is being finished.* The operating nurse assists the surgeon; the orderly brings supplies, helps with the dressing and cleans up the table. There is complete independence for each team.

"An ample supply of dressings, gloves, instruments and splints is at hand and the sterilizers for instruments are constantly boiling during work. After instances of gas-infection or before serious operation—especially head and joint—a complete clean-up of the surgeon and nurse is expected; otherwise for extremity wounds gloves may be washed on the hands and then dipped into sterilizing solutions.

"Nitrous oxid gas, ethyl chlorid, chloroform and ether anesthesia are used. The Shipway warm vapor chloroform-ether apparatus is much in vogue and is very useful for nasal anesthesia in head operations.

"Great rapidity and thoroughness of operative procedure is required. In time of stress the minor operating theater can be expanded to permit the performance of major operations." (No. 12 Casualty Clearing Station, B. E. F.)

ETHER ANESTHESIA IN WAR SURGERY WITHOUT PULMONARY COMPLICATIONS.

At one of the recent meetings of the Académie de médecine, Dr. Mériel, professor of the surgical clinic at the Faculté de médecine de Toulouse, presented a com-

munication on this subject. The main point that he claimed to establish was that the pulmonary complications frequently brought on by ether anesthesia are avoidable if a careful technic is employed during and after anesthesia. Julliard had already published statistics on nearly 10,000 etherizations without untoward effects of this kind. Meriel declared that since 1909 out of 4,880 etherizations he had not noticed a single grave complication; only occasionally in winter there had been a few benign cases of trachitis, which only rarely degenerated into bronchitis. As the result of long experience, Meriel was able to state that, if certain precautions are taken, ether anesthesia is not only easy to accomplish, but is also without any real danger, and is contraindicated only in the case of emphysematous and tuberculous patients, and can be employed even in operations about the face and neck.

HYPNOTIC SUGGESTION FOR RELIEF OF THE WOUNDED IN THE FIELD HOSPITAL

Podiapsky writes from Saratov in Russia to call attention to the way in which he has sometimes been able to free the wounded from suffering by hypnotic suggestion that there was no pain or by throwing them into a hypnotic sleep. He describes in detail a number of peculiarly distressing cases in which the immediate relief was most welcome. In war conditions he has found that the men responded with exceptional facility to hypnosis; he found only about 2 per cent. quite refractory. In conclusion he exclaims, "Why give chloroform to subjects who at a word drop off into an artificial deep slumber, which can be counted on in about 17 per cent. of the cases." Even the first degrees of hypnosis permit operations with much less of the general anesthetic than would otherwise be necessary. He has found it useful for the wounded of all the nationalities that he has encountered. Slavs, Teutons and Italians. He does not advise the hypnosis for major operations but mainly for the sensory crises of psychic origin, such as the pain left apparently in a limb after it has been amputated. A single hypnotic sitting may cure completely distressing pains of this nature. Podiapsky's polyglot environment caused trouble sometimes, as he did not always know the word for "wake up" in the patient's own tongue. Now he makes sure of this before attempting the hypnosis. (Paris Medical, August 25, 1917).

(To be continued)

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

INTERSTATE ASSOCIATION OF ANESTHETISTS. THIRD ANNUAL MEETING.

The Third Annual Meeting of the Interstate Association of Anesthetists was held at the Hotel Secor, Toledo, Ohio, October 9, 10 and 11, in conjunction with the Mississippi Valley Medical Association. There was a large attendance of interested surgeons, anesthetists and dentists in spite of war conditions which had called many into active service.

Dr. Charles W. Moots, of Toledo, Ohio, welcomed the Association in behalf of the local profession.

During the executive session the following officers were elected for the ensuing year: Elmer I. McKesson, M.D., Toledo, O., Chairman; John J. Buettner, M.D., Syracuse, N. Y., Vice-Chairman; F. H. McMechan, M.D., Avon Lake, O., Secretary-Treasurer; Members of the Executive Committee, Bion R. East, D.D.S., Detroit, Mich.; Emmett F. Horine, M.D., Louisville, Ky.; E. M. Sanders, M.D., Nashville, Tenn.; Wesley Bourne, M.D., Montreal, Canada; Thomas L. Dagg, M.D., Chicago, Ill., and Paul Cassidy, D.D.S., Cincinnati, O.

The minutes of the Louisville Meeting and the report of the secretary-treasurer were accepted as read.

Resolutions of condolence were extended to the families of Drs. W. P. Burdick, of Kane, Pa.; R. E. Holder, of Columbus, Ind., and Geo. H. Matson, of Columbus, O., members who had died during the past year.

The following resolution was passed unanimously:

Whereas, The Call to the Colors and the requirement of the army medical service at home and abroad will necessitate the services of many experts in anesthesia, therefore, be it

Resolved, that the Interstate Association of Anesthetists pledges its support to the Government and army medical service in the present emergency and that its members will serve in whatever capacity their experience is desired.

It was voted to release members in service from the payment of dues and to make up any deficit by a pro rata assessment on the other members, if necessary.

The following members were appointed as the nucleus of a Legislative Committee to look after the interests of licensed and qualified anesthetists in the United States and Canada: W. I. Jones, D.D.S., Columbus, O.; E. F. Horine, M.D., Louisville, Ky.; T. J. Collier, M.D., Atlanta, Ga.; C. N. Combs, M.D., Terre Haute, Ind.; Isabella C. Herb, M.D., Chicago, Ill.; Ralph P. Peairs, M.D., Milwaukee, Wis.; E. M. Sanders, M.D., Nashville, Tenn., and Samuel Johnston, Toronto, Canada.

The secretary was instructed to cast the Association's ballot for the election of the following new members: H. W. Barton, D.D.S., Akron, O.; Henry F. Becker, M.D., Danville, Ill.; S. L. Beckwith-Ewell, D.D.S., Hartford, Conn.; Theodore D. Casto, D.D.S., Philadelphia, Pa.; Leroy S. Colter, M.D., Cincinnati, O.; C. N. Combs, M.D., Terre Haute, Ind.; Chas. H. Gallagher, M.D., Ithaca, N. Y.; F. R. Hanley, M.D., Toronto, Canada; G. A. Havemann, M.D., New Bremen, O.; Edw. Wm. Hawkins, D.D.S., Pittsburgh, Pa.; O. C. Hickman, D.D.S., Windsor, Cal.; Walter H. Hisey, D.D.S., Toledo, O.; M. R. Howard, D.D.S., Denver, Colo.; Margaret M. Johnston, M.D., Toronto, Canada; P. H. Kilbourne, M.D., Dayton, O.; Louis H. Maxson, M.D., Seattle, Wash.; E. M. Morehouse, D.D.S., Yankton, S.D.; H. F. Parks, D.D.S., Jackson, Mich.; Ralph P. Peairs, M.D., Milwaukee, Wis.; Ralph M. Waters, M.D., Sioux City, Ia.; F. K. Siegel, M.D., Cincinnati, O.; F. L. Richardson, M.D., Boston, Mass.; J. P. Snyder, D.D.S., Columbus, O.; W. F. Drumburg, D.D.S., Milwaukee, Wis., and Iva M. Lickly, M.D., Lima, O.

The scientific program was presented as previously announced. The various papers will appear in the Supplement. A number were illustrated with lantern slides and moving pictures, which were shown by courtesy of the Temple Theatre management.

The Association had the distinguished honor of having as its guests Col. T. H. Goodwin, R.A.M.C., and Col. Charles Derle, of the French War Mission. Both addressed the joint meetings of the two societies.

The Association Dinner was served at the Hotel Secor on the evening of October 9 and was largely attended. Among the speakers were Dr. George F. Butler, of Mudlavia; Dr. Lafayette Barber, President of the National Dental Association, and Dr. Ira O. Denman, Secretary of the Homeopathic Laryngological Association.

The ladies attending the meeting were delightfully entertained and the local profession and the Toledo Commerce Club outdid themselves in showing all a splendid time.

The Indiana State Medical Association has extended the Interstate an invitation for a Joint-Meeting in Indianapolis next September. Its acceptance was left to the discretion of the executive committee.

Quarterly Index Of the Current Literature of Anesthesia and Analgesia.

ACTION OF ALYPIN, EUCAIN, HOLOCAIN, NOVOCAIN AND STOVAIN ON THE BLADDER. J. A. Weddell, Charlottesville, Va. Journal of Pharmacology and Experimental Medicine, October, 1917.

ANESTHESIA, AMERICAN METHODS OF. J. Luzoir. Presse Medicale, August 23, 1917.

ANESTHESIA, PRACTICAL AND EFFICIENT METHODS OF. Julian A. Zabrocki, Chicago. Dental Cosmos, October, 1917.

ANESTHESIA IN ORTHOPEDIC SURGERY. W. G. Elmer. Philadelphia. New York Medical Journal, September 29, 1917.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

FEBRUARY, 1918.

No. 2

TUBERCULOSIS OF ELBOW-JOINT WITH ESPECIAL REFERENCE TO TREATMENT.

MICHAEL CASPER, M. D.,
LOUISVILLE, KY.

The following brief report of a case of tuberculosis of the elbow-joint is presented to emphasize the importance of roentgenoscopy in the differential diagnosis of osseous lesions, and to illustrate the excellent results which may be secured by the intra-articular pressure-injection method of treatment.

It is well to remember, in passing, that the two chief chronic bone-destroying diseases are tuberculosis and syphilis. By careful roentgenoscopy differential diagnosis is possible between destructive lesions due to these two causes, and we are thus able to institute appropriate treatment at a much earlier period than we heretofore could. Early treatment is especially important in tuberculous infection, i. e., before osseous destruction has become extensive. The case here reported amply illustrates this feature:

Female, aged seven years, of healthy parentage, was brought to me by Dr. E. T. Grasser with the history of having fallen from a swing injuring her left elbow about two weeks previously. It so happens that this trivial injury, which was purely coincidental and not causative of the present trouble, did cause the joint to become actively swollen; hence, the mother was accidentally, as it were, forced to seek timely medical advice.

The roentgenoscopic examination "told the story,"—considerable destruction of the ulna and humerus having already occurred, as will be observed by the roentgenograms here reproduced. The radius was not involved, nor is it usually affected until late in the history of such lesions.

The little patient was emaciated, she had become anemic, and her temperature was actively febrile. She has been given general hygienic treatment, i. e., abundant exercise in the open air, she has slept on a sleeping porch for some time, and so-called reconstructives and tonics, such as iron, arsenic, etc., have been administered.

The serous exudate secured for bacteriologic examination failed to reveal the presence of tubercle bacilli, nor was a positive culture obtained on blood serum or agar. Guinea pig inoculation was not practiced in this case, although it is recognized as a very important diagnostic procedure. The diagnosis of a tuberculous lesion of the joint was plainly

evident by roentgenoscopy without the application of other tests, and I may say that the Roentgen-ray findings are pathognomonic in the majority of such instances. In nearly all cases of this kind a positive reaction is obtained by serum injection, but there seemed no reason for the application of that procedure in this instance.

The treatment consisted in pressure-injections of iodoform-formalin-glycerine mixture with the pressure syringe devised by the late John B. Murphy and the technique recommended by him used. The joint must be distended with the emulsion until all portions of its surface have been reached, mechanical separation being thus secured. Or if preferred the joint surfaces may be separated by traction while the emulsion is being injected. Distension may be readily and accurately accomplished under guidance of the fluoroscopic screen. All repeated injections are also gauged and timed according to the progress revealed by the screen.

The function of the joint has been completely restored; swelling and pain have disappeared, and this elbow appears quite like the opposite healthy joint from a roentgenoscopic viewpoint. The patient has gained considerably in weight; her rosy complexion and bloom of youth has returned to her face. It will be noted that the last roentgenogram shows not the slightest focus remaining.*

This method of treatment is not only applicable to tuberculous joints, but also to infective arthritis from any cause; and some excellent results have been secured. Murphy recommended a two-percent solution of formalin in glycerine, but in this case iodoform was added. Had it not been a tuberculous joint, the iodoform would have been omitted. I still have a great deal of confidence in the use of iodoform in tuberculous lesions. Murphy remarked that something better than formalin might eventually be discovered for use in lesions of this kind, which merely acts as an irritant coffer—damming as it were the lymphatic channels and preventing absorption of bacterial toxins or enzymes generated within the joint. I think therein lies the chief therapeutic action of formalin, i. e., it blocks the lymphatic channels and prevents absorption.

For the earliest accurate and comprehensive sur-

*The following plates show the original lesion and result of treatment. Not all the plates have been reproduced.

gical history of tuberculous lesions of the osseous system we are indebted to the inaugural thesis of Nelaton published in 1836. However, the names of Wiseman, Bell, Cooper, Rokitansky, Virchow, Volkmann, Gosselin, Kraske, Koenig and Ollier are also indissolubly associated with the early history of surgical tuberculosis. It was Volkmann who said "every lesion which was formerly called caries, pedarthrocase, spina ventosa, scrofulous inflammation of the bones and joints, white swelling (tumor albus), fungus of the joints, strumous affections of the joints, and, recently, fungous inflammation of the bones and joints, is, with exceptions which constantly grow rarer, to be regarded as true tuberculosis."

It is worthy of note that from the days of Hippocrates medical writers have variously described joint lesions which are now readily recognizable as tuberculous. Wiseman (1734) designated the condition "white swelling" (tumor albus), and attributed it to the effects of scrofula. Bell and Chester believed tumor albus due to two different causes, (c) scrofula, (b) "rheumatism" and trauma. Cooper stated that in healthy persons the prognosis of joint inflammation was good, whereas in scrofulous individuals tumor albus resulted. Rokitansky taught that the majority of such tumors were due to tuberculosis of the synovial membrane. Virchow believed the most serious forms of tumor albus (especially of the knee) were due to miliary tubercles; and Volkmann demonstrated the "tubercles of tuberculosis" in the joint lesions.

When the resistance of the body is sufficient to overcome the infection of tuberculosis, no extension of the disease occurs beyond the limiting layer of granulation tissue. Caseation destroys the tuberculous tissue, and a fibrous capsule is formed by the proliferation of the granulation cells, which protects the body from further extension of the disease. Absorption or even calcification of the caseous area may occur. It has been shown, however, that such areas of so-called healed tuberculosis are in reality a menace to the health of the individual. In bone tuberculosis especially the bacilli retain their virulence for long periods, and can be awakened to renewed activity by a diminution of the constitutional resistance or by some comparatively insignificant trauma. (Keen.)

It must be remembered that practically every organ and tissue embraced within the human organism may be invaded by the tubercle bacillus, and that lesions may be thus produced requiring surgical treatment. Tuberculous foci in the endocardium and the great vascular channels, did they occur pri-

marily, would, of course, be inaccessible to the surgeon; but in practically every other anatomic situation surgical treatment of such lesions is not impossible.

Joint tuberculosis is defined by Ely as proliferative inflammation of bone marrow or synovia characterized by the formation of typical tubercles and caused by the tubercle bacillus. To the question "why does tuberculosis involve the ends of the long bones rather than the shafts" he says various unsatisfactory answers have been given.

(1) Activity of the circulation about the centers of growth at end of the bone: This explanation is inadequate as it should also apply to other body structures.

(2) Slowing of the blood stream in capillaries of spongy bone: If this were true it would also predispose to other infections.

(3) Exposure to trauma: This is incorrect as tuberculosis lesions never follow severe injuries; moreover, that portion of the bone first involved is not exposed to trauma.

(4) The most widely accepted theory is that the arteries in the epiphysal area are end arteries which do not anastomose and emboli are supposed to lodge therein. Ely suggests that while this theory seems plausible it fails of adequate explanation since organs in other anatomic situations having end arteries are not similarly affected; this theory would also deny the possible synovial origin of the lesion. Furthermore, anastomosis is present in the ends of bones of adults, also in bones of the carpus and tarsus, and these are not infrequently involved in tuberculous infection; tuberculosis also exists in the ribs without regard to end arteries. The explanation lies, according to the author, in the quality of the marrow in the region of joints. Wherever lymphoid marrow exists the soil is favorable for proliferation of the tubercle bacillus. Synovia is a lymphoid structure and therefore particularly vulnerable. Tuberculosis remains confined to the two lymphoid elements in the joint, viz., the synovia and red marrow. When secondary infection occurs other structures become involved. Tubercles may form in the marrow beneath the articular cartilage, and entrance to the joint effected by either perforating the cartilage or burrowing along its edge. A healthy cartilage is an absolute bar to the progress of the disease. Rarely the inflammation may not reach the joint, but perforates the periosteum and thus extends to the surface. The deeper periosteal layer may be considered as an external layer of marrow and is thus open to invasion. This deeper layer is continuous with the synovia, as the superfi-

cial layer is with the ligament. The synovia is not a distinct structure and its limits are difficult to define. Purely synovial lesions are rare in childhood but fairly frequent in adults. The bone tissue is never invaded but reacts secondarily to the disease of its contained marrow. The cartilage suffers not from the tuberculosis but in nutrition from disease in the subjacent marrow.

Levings thinks trauma is the most frequent exciting cause of bone tuberculosis. Age is an important factor, the bones and joints being much more frequently involved in children than in adults. It is claimed by Fraser that joint infection owes its origin to a tuberculous focus elsewhere, being thus hematogenous or lymphogenous. The bacilli probably enter the joint via the nutrient or metaphyseal arteries. The synovial membrane is first attacked and as healthy bone cannot be infected, the marrow must first succumb to gelatinous degeneration, which is produced by tuberculous toxemia and endarteritis. The location of the infection depends upon the situation of the synovial reflection; if it is in relation to the epiphysis that portion is attacked; it is supposed the joint focus is an infected blood clot; a slight trauma may be the contributing cause. A tubercle in the marrow may soften and produce an "infiltrating tuberculosis," or the infection may become localized and an "encysted tuberculosis" result. The changes in the marrow show two stages: In the early or cellular a phagocytic action of the white cells occurs and fibrosis results; the later or fibrous stage is characterized by absence of fat corpuscles and more fibrous tissue resulting in an encapsulated focus. The lamellar changes are of two types, i. e., the lamellæ may be absorbed with resulting osteoporosis, or may be increased in thickness by fibrous deposits. The periosteum exhibits either a deposit of dense or porous bone; the blood vessels show a condition of endarteritis. Osseous tuberculosis is divided by Fraser into four varieties: (a) encysted, (b) infiltrating, (c) atrophic, and (d) hypertrophic.

According to Levings the joints are infected in two ways: (a) by a deposit formed in the epiphysis penetrating the joint and infecting the synovial membrane; and (b) by a primary infection of the synovial membrane. It is also believed the joint may become infected from a deposit in the epiphysis through the lymphatics. Tuberculous lesions in the synovial membrane are of two kinds: in one there is an abundant growth of tuberculous and connective granulation tissue, the synovial membrane is much thickened, with little tendency to caseous degeneration, and there is usually but little fluid in the joint. In the other there is but little granula-

tion tissue, but an abundant formation of pus which may penetrate the capsule and cause a periarticular abscess. According to a table compiled by Krause seventy-seven per cent of all cases of joint tuberculosis commence as a deposit in the bone.

Phemister claims that for the most part osseous destruction in tuberculosis is by caries in which dead tissue is absorbed as rapidly as formed. More or less extensive areas of necrosis develop either from rapid tissue invasion and caseation, or by the formation of a cone-shaped infarct from obstruction to the arterial supply. Whether the vascular obstruction is due to embolism, as originally asserted by Koenig, to obliterating endarteritis, or to the ingrowth and pressure of tuberculous tissue, has not been definitely determined. In any event the infarcted area becomes infected and the medullary space is filled with caseous material. It is separated into sequestra from the surrounding living bone by zones of tuberculous granulation tissue. The subsequent changes which such an area undergoes are variable. In some instances tuberculous granulation tissue invades the sequestrum which is disintegrated into "bone sand" and either discharged or eventually absorbed, leaving a cavity in the end of the bone bordering on the articular surface or epiphyseal line filled with granulations or with an exudate which later is rarely replaced by new bone. In others the sequestrum may become encapsulated and remain for months or years, although such an area is apt to contain a certain amount of tuberculous granulation tissue. Under the x-ray a sequestrum of long-standing casts a more distinct shadow than the surrounding living bone. This is due to the fact that it is formed early when the bone possesses its normal density, and subsequently as a result of the presence of the tuberculous infection and disuse, marked atrophy occurs in the surrounding living bone. Some of the sequestra cast heavier shadows than the corresponding bone on the healthy side, and the normal arrangement of the trabeculae is obscured. Cheyne states this is due to early new bone formation in the involved area before necrosis supervenes.

Tuberculous lesions are usually found at the epiphyseal ends of the long bones, in the vertebrae, in the spongy bones of the carpus and tarsus, and less frequently in the long bones of the hand and foot. Krause agrees that infection occurs in two ways: (a) bacilli may be carried directly through the nutrient artery to the epiphysis, and becoming arrested in some small terminal branch escape through the walls of the vessel and form tubercles in the spongy tissue, or (b) small particles of caseous ma-

terial in the lung ulcerate into the pulmonary vein and are carried to the heart, and by the arterial system to some small terminal artery in the epiphysis in which they lodge and form a tuberculous deposit. (Krause.)

Levings suggests that the election of the epiphyses of long bones and the short spongy bones as the usual sites of tuberculous deposits may perhaps be explained by the blood supply. As growth takes place at the epiphysis, this part receives more blood than does the shaft. The blood vessels are larger than those supplying the compact bone through the periosteum, and the same may be said of the spongy bones. Bacilli or caseous emboli implanted in the epiphysis form tubercles and these coalesce producing nodules, which may be circumscribed by sclerotic bone and healthy granular tissue and a cure effected, or softening and suppuration may sooner or later ensue. The bone cavity may be lined by a so-called "pyogenic membrane" composed almost entirely of tubercles and held together by fibrinous deposit. The surrounding bone is usually infected with caseous material affording an easy means of systemic invasion. The tuberculous nodule may undergo degeneration and become separated from the surrounding bone by inflammation resulting in a sequestrum. Where tuberculous nodules undergo softening and suppuration by ulceration they generally reach the surface through the periosteum producing a fistula, or penetrate the joint and infect the synovial membrane giving rise to tuberculous synovitis with perhaps destruction of the cartilage and caries of the bone surfaces. (Levings.)

The importance of early recognition and prompt institution of appropriate surgical treatment of tuberculous joint lesions cannot be too strongly emphasized. As stated at the outset, differential diagnosis by carefully applied roentgenoscopy according to modern perfected technical methods is now practically assured. However, enthusiasm concerning the value of this mechanical diagnostic aid should not be permitted to so obscure visual acuity as to cause neglect of clinical and anamnestic investigation. The surgeon, the internist and the roentgenologist should proceed harmoniously in the interest of the patient and the conservation of life. If foci of infection exist elsewhere within the organism their location should be discovered and the limits of invasion determined if possible, otherwise treatment cannot be intelligently applied.

The therapeutic indications in joint tuberculosis will primarily depend upon: (a) the age and physical condition of the patient, and (b) the location

and extent of the lesion. Treatment of the local lesion may be either conservative or radical, i. e., mechanical or operative. General treatment, improvement in hygienic surroundings, diet, etc., must not be neglected. Radical surgical methods will not be discussed in detail, as this paper refers particularly to other measures.

The method of treating tuberculous joints and abscesses by the injection of iodoform-glycerine emulsion was originated many years ago by Billroth and Mikulicz. Various other substances have also been similarly employed, such as phenol, iodine, turpentine, formalin, olive oil, zinc chloride, naphthol, etc. Lannelongue suggested a method of treating surgical tuberculosis not directed toward local destruction or inhibition of the growth of the tubercle bacilli, but the conversion of tuberculous tissue and its immediate surroundings into fibrous tissue, i. e., encapsulating the tuberculous mass, by injecting small quantities of a ten per cent solution of zinc chloride. Landerer preferred cinnamic acid five parts to ten of olive oil, the yolk of one egg, and on hundred parts of normal saline solution rendered alkaline before injection. Koenig believes extirpation of the capsule alone without removal of the joint extremities was an unsafe procedure. The injection of iodoform-glycerine emulsion is commended by Bergmann, Koch and many other older writers.

Iodoform holds the highest place in the treatment of open tuberculous affections, and when applied directly to the tuberculous lesions by intra-articular injection it is almost a specific in certain forms of joint tuberculosis not complicated by pyogenic infection. It is useless in cases of mixed infection. For parenchymatous and intra-articular injections a ten per cent glycerine emulsion yields the best results. (Senn.) In a paper written over twenty-five years ago on the treatment of tuberculosis of bones and joints by parenchymatous and intra-articular injections Senn presented the following conclusions which will apply with equal force to present-day practice.

(1) Parenchymatous and intra-articular injections of safe anti-bacillary substances are indicated in all subcutaneous tuberculous lesions of bones and joints accessible to this treatment:

(2) Of all substances so far employed in this method of treatment, iodoform has yielded the best results:

(3) The curative effect of iodoform in the treatment of local tuberculosis is due to its anti-bacillary effect, and its stimulating action on the healthy tissues adjacent to the tuberculous product:

(4) A ten per cent emulsion in glycerine or pure olive oil is the best form in which this remedy should be administered subcutaneously:

(5) The ethereal solution should never be employed, as it is likely to cause necrosis of the tissues overlying the abscess, or iodoform intoxication:

(6) Tuberculous abscesses, and joints containing synovial fluid or tuberculous pus, should always be thoroughly irrigated with a three to five per cent solution of boracic acid before the injection is made:

(7) Injections should be made at intervals of one or two weeks, and their use persisted in until the indications point to the cessation of tuberculous

(11) Parenchymatous and intra-articular medication with anti-bacillary material has yielded the best results in tuberculous spondylitis attended by abscess formation and tuberculosis of the knee and wrist joints:

(12) This treatment may prove successful in primary osseous tuberculosis followed by involvement of the joint, provided the osseous foci are small:

(13) Extensive sequestra of articular ends, with secondary tuberculous synovitis, always necessitate

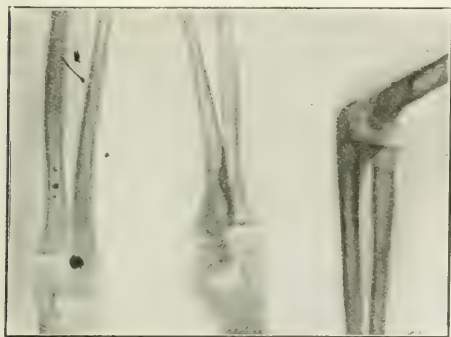


Fig. 1.

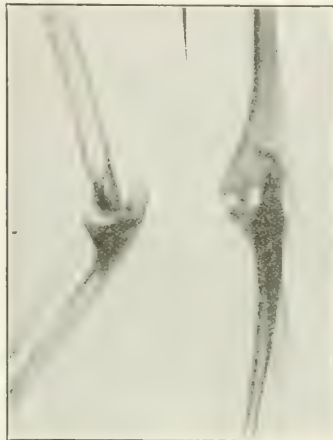


Fig. 2.

inflammation and the substitution for it of a satisfactory process of repair, or until the result of this treatment has shown its inefficacy, and indications present themselves of the necessity of resorting to operative intervention:

(8) If the treatment promises to be successful, symptoms pointing to improvement manifest themselves not later than the second or third injection:

(9) In tuberculous empyema of joints and tuberculous abscess, gradual diminution of the contents of the joint or abscess at each successive tapping, lessening of the solid contents of the fluid and increase of its viscosity, are the conditions which indicate unerringly that the injections are proving useful, and that in all probability a cure will result from their further use:

(10) Moderate use of the limb is compatible with this method of treatment, provided the disease has not resulted in deformities which would be aggravated by further use of the limb; in such cases correction of the deformity should be postponed until the primary joint affection has been cured by the injections:

resection; but preliminary treatment by iodoform injection into the affected joints constitutes a valuable preparatory treatment to the operation, and adds to the certainty of a favorable result:

(14) In open tuberculous affections of joints, incision, scraping, disinfection, iodoformization, iodoform gauze tampon, suturing, and subsequent injection of iodoform emulsion, is advised, and yields excellent results, and should be employed in all cases in which a more formidable operation can be avoided:

(15) Balsam of Peru ranks next to iodoform in the treatment of tuberculous affections of bones and joints; and if the latter remedy for any reason cannot be employed or has failed in effecting the desired result it should be given a fair trial if operative treatment is not urgently indicated.

In the introduction of oil or other medicinal agents into the joints Brackett places especial stress upon the technique, emphasizing the fact that open incision should always be used; because in this way only can the joint be explored and adhesions properly freed. It also affords opportunity to ob-

with a view to the microscopic examination in confirmation of the diagnosis. The author states that in the knee joint the skin incision is usually made on the inner side in the form of a "blunt ellipse"; in the fascia, a smaller ellipse in the opposite direction. A straight and shorter incision is made in the capsule about one-half inch from the patellar border in the vertical direction of the limb. A special stitch is used to close the capsule, silk being used throughout. A continuous suture is introduced beginning at both ends and including the fibrous portion of the capsule, but extending not quite through the synovia; thus making the synovia act as a valve. Two mattress sutures are used to close the incision and the second smaller one is enclosed by the first and its opening placed below. The syringe is inserted between the threads of the inner mattress, and the stitches drawn tight. This allows the oil to be introduced into the joint under tension; it is the tension of the oil in the capsule which the author believes is of the greatest importance. Pure neutral acid-free olive oil is used. It is sterilized in boiling water for half an hour; three and a half ounces are used in an adult joint. Especial care is urged in the selection of cases for this operation, which he says is applicable to capsular involvement in various types of infection without implication of the articular surfaces. Two groups are mentioned: (1) cases of old infection in which adhesions have been freed, and it is desirable to keep the surfaces apart (the effect in these cases is largely mechanical); (2) cases of infection: (a) acute infection,—Neisserian, etc., (b) tuberculous synovitis,—early stage, and (c) chronic arthritis,—selected cases. The procedure is not a substitute for arthroplasty, and is inapplicable to lesions where the x-ray shows involvement of the articular surfaces. In early tuberculous lesions the most marked and definite improvement occurs. The injections are repeated several times at intervals of eight to twelve weeks. The procedure does not take the place of fixation and rest, but permanent fixation is inadvisable.

In the treatment of tuberculous joints Porter says there are three distinct indications: (a) to increase resistance, (b) place the joint in the best possible position for future usefulness, and (c) to prevent deformity. Under mechanical treatment immobilization is given the chief place, and the fact is emphasized that immobilization must be complete until the joint has healed. Plaster of Paris is efficient in the early stages. Bier's obstructive hyperemia is mentioned as a probable aid when thoroughly and efficiently used surgical

treatment for joint fixation in adults is advised; otherwise surgery should be avoided so far as possible. Antiseptic injections are considered by the author as practically useless. Similar views are expressed by Ely and many other observers.

Ruth claims incision into a tuberculous effusion leads almost invariably to mixed infection, and should be avoided if possible. Operative procedures of all kinds upon tuberculous joints in children prolong the treatment and give results "worse than no treatment at all." The final outcome of treatment must not be counted in any individual case until the patient has reached adult age. The author commends the operative procedures of Hibbs and Albee as distinct advances in the surgery of Pott's disease.

Leonard tabulated the results obtained for nineteen years at Garre's clinic in the treatment of joint tuberculosis of the upper extremity. Of one hundred and forty-five cases treated, twenty-five were tuberculosis of the shoulder, seventy-nine of the elbow, and forty-one of the wrist-joint. The treatment was individualized according to the anatomic location and function of the joint. In 31.5 per cent the lesion involved the humerus alone, in 10.5 per cent the articulation between the clavicle and acromion process, in 11 per cent the glenoid cavity of the scapula, and in 47 per cent the entire shoulder-joint was involved. There was caries sicca in 12 per cent. The treatment was conservative, consisting of injections, Bier's hyperemia, hot air, and rest. If this was unsuccessful excochleation or resection was performed. Eight were treated conservatively, excochleation was done in five, and resection in twelve. The resected cases gave the best permanent results. The entire elbow-joint was involved in 60.3 per cent of the cases. Garre believes tuberculosis of the elbow-joint in children should be treated conservatively by placing the arm at rest in right-angled position, whereas in adults resection should be performed. Resection was practiced in thirty-four instances and the immediate and late results were the best in these cases. Excochleation was performed twenty times and five of these patients completely recovered. Amputation was performed in four instances. Of forty patients with wrist-joint tuberculosis twenty-two were males and eighteen females. The right hand was chiefly involved in the males; and the males were attacked with tuberculosis of the wrist-joint at a more advanced age than in the other two joints mentioned. The treatment was as conservative as possible, and when operation was performed the neighboring tissues were spared whenever feasible,

only the diseased tissue being removed and conservative after-treatment practiced. In tuberculosis of the wrist-joint no really satisfactory results were obtained (either immediate or late), nor was the function restored; so that tuberculosis of this joint offers the worst prognosis of all the forms of joint invasion both as to life and function.

Ymaz protests against the designations "surgical tuberculosis" and "local tuberculous lesions" as experience has amply demonstrated that operative measures are rarely required and necropsy findings scarcely ever fail to reveal some focus elsewhere,—lungs, pleura, or mediastinal lymph nodes. Treatment should therefore be by general measures as for pulmonary tuberculosis,—rest, immobilizing the limb, and exposure to direct sunlight. Intra-articular injections are not only useless but dangerous in many instances. The author states that he once witnessed the transformation of a favorably progressing knee-joint lesion into a purulent arthritis under the influence of five injections into the joint by an eminent specialist whose technique was above suspicion. He further cites nine cases from the literature in which local injection of camphorated naphthol proved directly fatal.

Schmeiden claims that a tuberculous joint must be movable after healing has occurred. Bier says a stiff joint following healing of tuberculosis is not a good result; the resection of a joint is, in regard to a cure, an illusion; it is followed perhaps by healing of the tuberculous lesion, but not by healing of the joint; there is destruction of the joint,—a mutilation. Especially favorable results are said to accrue from the Bier method in tuberculous lesions of the ankle, elbow and wrist. In these locations not only beginning and less advanced cases are curable, but such as formerly would have been resected or amputated. The severity of the disease is never a contra-indication to treatment by means of hyperemia. The old rule that in people of advanced age amputation is the best treatment is considered unjust by the author, for in these cases the treatment by hyperemia is just as effective as in younger individuals. By using hyperemia almost exclusively in the treatment of tuberculous joints, Bier has seldom to perform resection; in fact resections in his clinic have become few in number. The operation is performed when the general condition of the patient is unfavorable, when amyloid degeneration is present, or an additional widespread pulmonary tuberculosis. "The Bier method practiced with the necessary patience will give results which cannot be obtained by any other treatment. Its goal is none other than that

of healing without loss of function." "Formerly I considered the hyperemic treatment of tuberculosis as good; now I consider it the best." (Bier.)

Although the direct rays of the sun have been utilized for therapeutic purposes to some extent for many centuries, only recently has the method been placed upon a strictly scientific basis. According to Pryor, credit for this is due especially to Rollier of Switzerland. His method consists in gradually exposing the entire body to direct sun rays, carefully avoiding sunburn by beginning with five-minute exposures every hour of the feet and ankles only on the first day, increasing the time and the area exposed until the entire body surface is exposed and deeply pigmented. Finally after a deep tan is obtained the diseased part is exposed. The patients are kept on beds, and mechanical apparatus for fixation and extension are applied where necessary. His records for ten years show over 80 per cent cures in closed tuberculous lesions and over 70 per cent in open cases. His clinic is at an altitude of four thousand two hundred feet.

It is claimed by Schmerz that heliotherapy represents the optimum of climatotherapy. The sunlight treatment of surgical tuberculosis, which has given the best results in mountainous districts and on the seashore, is also satisfactory on the plains and even in large cities. Heliotherapy should form the basis of all treatment in cases of surgical tuberculosis in the lowlands as well as in cities. A satisfactory explanation of the effect of sunlight on the human body in healthy and diseased conditions cannot be given at the present time in the absence of extensive experimental researches. The effect of solar energy on tuberculous tissue and the role played by the resulting cutaneous pigment cannot be definitely explained. Schmerz records in detail the sunlight treatment of thirty-four cases of surgical tuberculosis (bones, joints, glands, skin); eleven patients were cured, nineteen improved, and four died. The results were not as brilliant as those reported by Rollier, but were in the main satisfactory. Supportive measures are indicated, proper diet, iron, arsenic, and cod liver oil with phosphorus. Radio-therapy (Freund) of surgical tuberculosis should also be used in appropriate cases. Finally, surgical and orthopedic measures should be undertaken where indicated.

The local reactions appearing under heliotherapy as noted by Guye are: increase in volume in closed tuberculosis, localized sweating and rise of temperature over the focus, demonstrable change in consistency, and pulsation which can be demonstrated on palpation. In fistulous lesions there is

generally a decrease in volume with more abundant secretion which has a tendency to become hemorrhagic-serous; and finally reddening and swelling of the edges of the fistula. As to the immediate effect of heliotherapy on joint function: it often-times grows worse at first on account of increased swelling, but almost immediately afterward there is improvement,—fibrous ankylosis (?). Among the symptoms noted by the patient are: a circumscribed feeling of heat in the joint, decrease or cessation of pain; in abscesses sometimes a feeling of pulsation; in overdosage, an unpleasant or even painful feeling of tension. Advanced cases of tuberculosis often react with pronounced rise of temperature even when not the focus but a different part of the body is exposed, and the same may be said of foci in an acute stage of development. The depth and localization of the focus also influence the degree of local reaction. Guye describes the therapeutic effects of this local reaction as follows: disappearance of pain, increase in mobility, retrogression of exudates, loosening of hard infiltration, discharge of sequestra, etc., as has previously been repeatedly described by Rollier. Overdosage may produce serious consequences, may even cause spreading and generalization of the tuberculosis. The local reaction is inflammatory in nature. It is important that the patient be closely observed during sunshine treatment. An effort is made to produce slight reactions; if success is not attained with the usual technique, it is best to be satisfied with "distant irradiation"; that is, the focus itself is not exposed to the sunshine bath, but the balance of the body more or less.

It is believed by Kocher, Stoller, Huber, Garnier and Schlitowsky that the value of heliotherapy has been greatly exaggerated because of the unwise enthusiasm of its advocates. Kocher states that in addition to heliotherapy Rollier makes extensive use of orthopedic methods, and his good results are at least partially to be attributed thereto. "Rollier was assistant in Kocher's clinic for four years, and has since put to excellent use what he learned there as a supplement to his heliotherapy." While not disputing Rollier's theories as to the cause of the good results of heliotherapy, effect of the ultra-violet rays, pigment formation, etc., Kocher believes open air treatment day and night according to Halsted's method, would give as good results as Rollier's heliotherapy. With reference to other methods of treatment, such as brine baths, Koenig's quartz lamp, roentgen rays, tuberculin, Bier's hyperemia, iodine, phenol, etc., Kocher agrees with Arndt that they are not to be compared with helio-

therapy. The drawback of heliotherapy, which even its most ardent advocates cannot dispute, is its long duration and the tremendous expenditure of time and money to remain for years at a mountain sanitarium. This excludes all but the wealthy classes. But even then it is unjustifiable to treat bone and joint tuberculosis by purely expectant and hygienic methods. Radical local treatment, if performed under proper indications and with requisite technique, cannot be supplanted by any other method; and when by the removal of a tuberculous focus or sequestrum the surgeon can within a few weeks cause recovery of a lesion which would otherwise incapacitate the patient for years, it is manifestly his duty to operate. There may be danger in operation if other organs are involved, especially in children, in elderly people, in neglected cases, or where other infections coexist,—for instance, with pus cocci or colon bacilli. Under such circumstances free air and sunshine treatment is indicated in combination with orthopedic measures; but even then only until favorable conditions are re-established for operation. In patients for whom it is impossible to spend as much time and money as is required by heliotherapy, radical operation is certainly indicated, consisting of total excision of bones, total resection of joints, or even atypical operations which totally remove the local tuberculous focus. With especial reference to the elbow-joint, Kocher says in view of the 10 to 22 per cent of deaths which eventually occur from such lesions, there can be no doubt that this form of tuberculosis is very frequently complicated by invasion of other organs; and therefore general treatment is indicated. If prolonged treatment is impossible resection should be performed, as the operation is practically devoid of danger and the results are better than from general treatment without heliotherapy. The strictest asepsis should prevail during the operation and permanent antisepsis be maintained by the use of iodoform.

Relative to the use of tuberculin in the diagnosis and treatment of bone tuberculosis there is great diversity of opinion, and little further need be said. It is quite generally agreed, however, that small doses in selected cases produce no ill-effects. Hackenbruch mentions eighty-one cases, most of them joint and glandular tuberculosis, where the favorable influence of tuberculin "Rosenbach" injections was clearly manifest. The general condition was improved, local pain was diminished, and the fistulous secretion gradually ceased. Tuberculin "Rosenbach" is recommended both for diagnostic and therapeutic purposes. In carefully increased dosage

given for a number of months it has a decided curative effect, especially in conjunction with the current methods of conservative treatment, such as Bier's hyperemia, heliotherapy, and iodine medication. (Hackenbruch.)

Burnham emphasizes the value of "sensitized bacillary emulsion" of tubercle bacilli in both localized and pulmonary tuberculosis. The emulsion is prepared by growing tubercle bacilli in an anti-tuberculous serum, and then washing the bacilli to remove the excess serum, after which the bacilli are prepared in an emulsion, 1 ccm. containing the equivalent of 5 mg. of dried bacilli. He begins with small doses (one-millionth ccm. or less), increasing the quantity gradually and administering every five to eight days. Of fourteen patients with surgical tuberculosis thus treated, there was marked improvement in four, fair improvement in six, no change in three, and one became worse.

Roentgenotherapy may be advantageously employed in certain cases; but prolonged treatment is necessary, and even then the ultimate outcome is problematical. The x-ray possesses greater value as a diagnostic agent than a curative method in surgical tuberculosis. Ernst gives a tabulated review of the results secured with the "general carbon arc light bath" in one hundred patients treated having one hundred and fifty surgical tuberculous lesions. Of five cases of closed elbow-joint tuberculosis, three healed with normal mobility of the joint, and one with partial mobility.

This rambling review of available literature would be incomplete without brief reference to the remarkable method of treating joint tuberculosis said to be advocated and practiced by the famous Sir Arbuthnot Lane of England. In substance he contends that invasion of joints by the tubercle bacillus is attributable to fecal stasis within the colonic lumen, with autointoxication from absorption of bacterial products and consequent lessened vital resistance of the individual. It is stated that for several years he has treated patients with advanced tuberculous joint lesions by ileocolostomy. Comment upon his method of reasoning seems unnecessary, excepting to suggest that ileocolostomy for attempted cure of joint tuberculosis is about on a parity with his advocacy of colectomy for the cure of exophthalmic goiter, mammary carcinoma, "rheumatoid" arthritis, Still's disease, duodenal ulcer, trifacial neuralgia, etc. A prominent Louisville medical gentleman who visited Lane's clinic in Guy's Hospital recently makes the following uncomplimentary statement: "In listening to this remarkable man's trite sayings one is impressed with

the idea that he must be either a genius of the most modern type, an egotistical ass, a consummate fool, or a crazy man." From a study of the literature to which his name has been attached, I am inclined to agree with the diagnosis made by the Louisville surgeon quoted.

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WAR NEUROSES.

Although an excessive incidence of mental diseases has been noted in all recent wars, it is only in the present one that functional nervous diseases have constituted a major medico-military problem. As every nation and race engaged is suffering severely from these disorders, it is apparent that new conditions of warfare are chiefly responsible for their prevalence. None of these new conditions is more terrible than the sustained shell fire with high explosives which has characterized most of the fighting. It is not surprising, therefore, that the term "shell shock" should have come into general use to designate this group of disorders. The vivid, terse name quickly became popular and now it is applied to practically any nervous symptoms in soldiers exposed to shell fire that cannot be explained by some obvious physical injury. It is used so very loosely that it is applied not only to all functional nervous diseases but to well-known forms of mental disease, even general paresis.—THOMAS W. SALMON, M.D., in *Mental Hygiene*.

VINCENT'S ANGINA.

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Angina is mainly a descriptive and qualifying term which can be only correctly employed symptomatically; and in that restricted sense it may be applied to any pathology having as a characteristic concomitant or complicating feature a sensation of strangling, suffocation, or spasmodic choking. The phenomenon has been observed as an accompanying symptom of numerous acute and chronic affections, neoplastic formations, etc., involving the mouth, throat, the intra-thoracic and even the upper intra-abdominal viscera.

Stomatitis, with or without throat involvement and consequent anginal manifestations, was recognized and described hundreds of years ago; but specific ulceromembranous stomatitis which is now more familiarly known as *angina Vincenti* is of comparatively recent discovery, having been first accurately described and named by Vincent in 1896. It is essentially an infectious or contagious disorder which may attack any portion of the bronchial, laryngeal, pharyngeal, tonsillar, palatine, lingual, gingival or buccal mucosa. The tonsillar tissue, however, is the most common site of the disease.

Two forms of the malady have been clinically recognized: (a) the acute, which may be confined to the tonsillar tissue, and (b) the chronic, which may attack any or all the other structures mentioned. The disease has also been classified as: (a) primary, when it involves only the tonsil, and (b) secondary, when extension occurs to adjacent structures.

Etiology: Vincent's angina is most frequently observed during childhood and early adult life, although no age is exempt. There are many predisposing factors, such as insanitary surroundings and unhygienic modes of life; general and local affections which contribute to reduction in physical vitality, such as measles, pertussis, scarlatina, diphtheria, tuberculosis, typhoid fever, syphilis, scurvy; tonsillitis, pharyngitis, laryngitis, bronchitis; mercurial stomatitis, ulitis, alveolar abscess, dental caries, etc. The disease has not infrequently followed the trauma incident to tonsillectomy and other surgical operations upon the throat, particularly in individuals whose vitality was markedly reduced.

For several years the specific influence of the associated or symbiotic micro-organisms described by Vincent, i. e., the fusiform bacillus and the spirochete which bears his name, seemed doubtful;

and a few bacteriologists have continued to question their actual specificity. It is the contention of certain laboratory workers that the spirillum and the fusiform bacillus are one and the same organism in different stages of development, and that their constant association in Vincent's disease is thus readily explained. This view seems to me untenable, since "the fusiform bacillus is a large, long, slender, rod-shaped, non-mobile organism, slightly swollen in the middle, and tapering to a point at each end. It stains readily with carbol fuchsin, or any of the carbol violet stains. Carbol methylene blue leaves portions of the organism unstained, unless immersion is continued for fifteen minutes instead of five. It is also stained by Leischmann's method. The spirillum is large, with undulations few in number and of wide amplitude. The presence of these two organisms together in the smear is characteristic, and when once the combination is seen, it is so readily recognized that it could scarcely ever afterward be mistaken for anything else. There is little difficulty in distinguishing the spirillum from the spirochete of syphilis, although it is not unlike some non-pathogenic spirilla, particularly the buccalis. The Vincent's spirillum stains easily, whereas the treponema pallidum stains with difficulty and is colored red by Giemsa's stain. The spirochete of syphilis is smaller, extremely slender, has a low index of refraction, and a characteristic complete corkscrew spiral arrangement, apparent both in motion and rest. The turns of the spiral are deep, close, and regular."

Richardson believes the Vincent organisms are not apt to produce the disease unless the teeth, mucosa or tonsils are in an unhealthy condition, or the general health of the individual is below par. He agrees that the greatest number of cases are noted among children and young adult males. The usual point of attack is the tonsil, but it may involve the uvula, soft palate, tongue, mucosa of the gums, cheek and lip, the sublingual glands, the larynx and trachea, the latter especially in children.

It seems established beyond any reasonable question that Vincent's angina owes its origin to the symbiotic action of the fusiform bacillus and the spirochete. In about three hundred cases of ulceromembranous inflammation of the mouth, Taylor and McKinstry found the fuso-spirilliform organisms of Vincent in all. In addition to the diffuse form of inflammation due to these organisms they noted the frequent occurrence of cases in which the infection was limited to the gums near the necks of the teeth and "have come to regard this as a clinical entity." In a series of seventy cases of Vin-

cent's angina examined, this marginal gingivitis was found in every case, while in one hundred and fifty cases of this form of marginal gingivitis the characteristic lesions of Vincent's angina were present in only seventy. The histories of such cases showed the same sequence of events as characteristic of all. First there was infection of the gums, and later involvement of the throat. The infected gums often caused no symptoms other than more or less free bleeding when the toothbrush was used. This often lasted for days or weeks before tonsillar or pharyngeal infection developed, and in some cases even for months or years. The condition of the gums was often confused with pyorrhea alveolaris, though differing from it in never showing any pus cavities or pockets and in yielding rapidly to treatment. In some cases there was a history of frequent attacks of sore throat and examination of these showed old scars on the tonsils or the pharynx. The diagnosis of this form of gingivitis was made by the results of microscopic examination of smears.

Symptomatology: The symptoms of the disease may vary within widest limits, depending upon whether the form is acute or chronic when the patient comes under observation, also upon the virulence of the infection and the tissues implicated, together with the physical status of the individual. In the acute or tonsillar form severe pain may be of sudden development without elevation of temperature or other evidence of systemic disturbance. The tonsil becomes red, swollen and edematous, ulceration and membranous formation quickly supervene. The ulcerated tonsillar area is extremely sensitive to mechanical manipulation, and is attended by enlargement and induration of adjacent lymph glands. Systemic disturbance is seldom profound, the patient complaining only of acute swelling and pain in the throat. Symptoms of strangling or suffocation (angina) depend upon the extent of obstruction from edema.

In the so-called chronic form the symptoms are gradual in their development. The first manifestation noted may be ulcerative inflammation of the faucial pillars, palate, gums or other portion of the buccal mucosa. In rare instances there is first a bronchitis, pharyngitis, or glossitis. Primary acute or chronic laryngitis has not been reported, but the larynx may become implicated secondarily. The ulcerative lesions attending the chronic type markedly resemble those of simple stomatitis, diphtheria, syphilis, and malignancy. Systemic disturbance is even less in the chronic than in the acute form of the affection.

Pathology: The pathology is invariably the same

whether the disease be acute or chronic when the patient is first observed. The ulceration may be superficial or deep, but in the majority of cases only the superficial tissues are involved in the ulcerative process. The membranous exudative formation may be slight or extensive, depending somewhat upon the virulence of the disease, the site of greatest involvement, and vital resistance of the patient. It is claimed by Richardson that the ulcers are deep and do not extend from the edges as in diphtheria; the membrane is light and friable, whereas in diphtheria it is thick and tough. The lesions covered by adherent membrane oftentimes closely resemble diphtheritic ulceration. Synnott says, "the slough over the lesions in Vincent's angina is a pseudo-membrane, due to necrosis of the superficial layers of the mucous membrane, and not a true exudate, as in diphtheria."

Ramond usually found the lesions of Vincent's angina unilateral or much more pronounced on one side. The gland below the jaw was involved constantly and early. The ulceration soon burrowed deep, while the exudation covering it became thinner. The ulceration took two or three weeks or a month to heal leaving a deep cavity; sometimes the tonsil was almost totally destroyed. In a third of his cases there were lesions in the throat of another nature; in one case a syphilitic chancre of the tonsil. In a recent small epidemic of diphtheria, there were five cases of associated diphtheria and Vincent's angina.

Diagnosis: Since Vincent's angina is rather uncommon, doubtless many cases remain unrecognized. Accurate diagnosis based upon the clinical symptomatology alone may be impossible. The ulcerative lesions may resemble those due to syphilis, diphtheria, streptococcic and other infections producing ulceration and membranous formation. The intense pain accompanying the acute form, without elevation of temperature, should suffice to differentiate the disease from quinsy which is always attended by more or less fever. The chronic form is frequently mistaken clinically for simple stomatitis, diphtheria, syphilis or malignancy.

Accuracy in diagnosis is attainable only by laboratory investigations. By making a smear from the ulcer the microscope will reveal the characteristic fusiform bacillus associated with the spirochete. These two organisms invariably coexist in Vincent's angina, and the microscopic picture is identical whether the disease be acute or chronic. The doubtful statement is made by certain authors that clinical diagnosis is readily made "from the irregular nature of the ulcerations, with bright red mar-

as a typical feature of the lesion, removal of which easily excites bleeding, the foul breath, rather intense pain, and functional signs such as trismus or dysphagia." In my opinion these clinical signs are insufficient to establish the diagnosis, and to avoid error microscopic examination of fresh smears should be made in every instance.

Synnott agrees that the diagnosis of Vincent's angina depends upon the laboratory. Syphilis may be excluded by the Wassermann test. The dirty, yellowish or greenish-yellow slough, resting upon an ulcerated base which bleeds easily, and the fetid odor are said to be clinically characteristic. The low range of temperature and pulse out of proportion to the local manifestations are also helpful in excluding clinically such diseases as diphtheria and infections due to ordinary inflammations from pyogenic organisms like the streptococcus and the staphylococcus. However, it is always best to make a culture when diphtheria is suspected.

Prognosis: In primary infections the prognosis as to life is almost universally favorable, provided the patient receives adequate treatment. However, when Vincent's angina develops secondarily during the course of some other more serious infection, the prognosis is sometimes grave and fatalities have occurred. Synnott claims the prognosis is almost invariably favorable, the fatal cases being exceedingly rare, and usually when they have occurred, have been due to complications, such as laryngeal ulceration, bronchopneumonia, toxemia, meningitis, cerebral, hepatic, splenic or ethmoidal abscess. He reports a fatal case in a two-year-old child, where infection began in the tonsil. The ulcers did not respond to treatment, and the condition of the child became serious. There were recurring and severe chills with pyrexia and profound toxemia, followed by a general pyemia with multiple abscesses in various parts of the body. The pus from these abscesses contained no micro-organisms, cultures upon various media giving no growth whatever. The child had complete anorexia and was kept alive for ten days by gavage, finally succumbing to prostration.

Goux reports a case of Vincent's angina which he saw at the eleventh hour. It was thought probably that tracheotomy in this particular case would have been the proper treatment. The patient was comfortable when he arrived, and the idea of operative intervention was, therefore, dismissed. About three hours later he was hurriedly recalled, but the patient died before his arrival. He states this was evidently an extremely virulent form of the disease. Colver says involvement of the larynx in these cases is almost always fatal, that he has

read of instances in which intubation or tracheotomy has been performed, but in none have such procedures been successful.

Reiche encountered one hundred and thirty-nine cases of Vincent's angina (in addition to 4,052 of simple angina) at the Hamburg-Barmbeck Hospital during a period of twelve years. In another group of twenty-three cases Klebs-Loeffler bacilli were present, which had no influence upon the clinical picture. In two instances Vincent's angina was superposed upon diphtheria. In two cases what seemed to be pure Vincent's angina ran an exceptionally severe course, terminating fatally in one. This patient was a child aged eleven years; the disease was of several weeks' duration, and pernicious anemia had developed. Marked improvement followed cleansing the mouth with hydrogen dioxide, but this proved transient and the child died within two months. The other patient was a young woman in whom Vincent's angina caused severe general disturbances, with intense headache, leucopenia, eosinophilia, abducent paralysis, splenic enlargement, and partial destruction of the soft palate. The abducent paralysis developed the twenty-sixth day, and disappeared after three and a half weeks. The angina ran its course in about six weeks and complete recovery followed.

Treatment: The multitude of agents recommended for local and general exhibition in Vincent's angina amply testifies to the unsatisfactory and unsettled state of our knowledge concerning the therapeutics of this apparently trivial affection. Personally I have found silver nitrate solution and trichloroacetic acid locally applied the most satisfactory in acute cases, a favorable outcome accruing from these measures in about two weeks. The chronic form is of course more rebellious, and local treatment must necessarily be continued over a longer period of time. In this type the intravenous injection of salvarsan or neosalvarsan is highly recommended by those who have recently been most successful in the treatment of this disease. Salvarsan solution has also been applied locally with benefit. The administration of moderate doses of the iodides is said to be beneficial following the salvarsan treatment, and it would seem reasonable to believe mercury might be advantageously employed; but in my experience its administration has been unproductive of appreciable benefit.

Care should always be exercised in mechanically removing the membranous exudate, to inflict the least possible damage upon the delicate underlying structures; otherwise hemorrhage may be considerable, especially if there is any individual tendency toward hemophilia. I have experienced no diffi-

culty in removing the membrane by means of a probe wrapped with absorbent cotton dipped in weak iodine or normal saline solution. Manipulations should be gently made for the reason already stated.

In addition to local measures, internal medications which tend to increase vital resistance and restore normal physical equilibrium are especially indicated. Iron, strychnine and other so-called tonic and reconstructive agents may be advantageously used. Internal treatment should be supportive and eliminative to secure the best results.

Ramond agrees with other writers that the microbiology and treatment are practically the same for each localization. He believes neosalvarsan is the best remedy, but is too expensive and something must be substituted, viz., intensive local treatment. All membrane must be removed mechanically, after which solution of silver nitrate 1:50 is applied. This should be preceded by a gargle of cocaine solution, and the use of a blunt curette for removing all membrane and sanious detritus. Hemorrhage is slight and controlled by a gargle of hydrogen peroxide. He claims the raw surfaces begin to granulate and soon cicatrize under this method of treatment.

We are reminded by Renaux that Zilz, Netter, and Aehard recommend the use locally of a ten per cent solution of neosalvarsan in glycerine. This solution does not deteriorate for a long time; it is neither caustic nor painful; it may be applied to the ulcers three times daily. He suggests that the parts be previously cleansed with physiological salt solution.

According to Synnott, in addition to the drugs already mentioned, the local treatment includes such remedies as methylene blue, tincture of iodine, Lugol's solution, and hydrogen peroxide. Orthoform lozenges relieve the dysphagia. For severe cases with deep ulceration into the fauces or larynx, and in obstinate cases which tend to become chronic, he states good results have been obtained from salvarsan intravenously, and also applied locally triturated with glycerine. "As Vincent's angina appears to be a spirillum disease, the administration of salvarsan seems to be a logical procedure in such cases."

Colver refers to seven cases of Vincent's angina observed during one year, and suggests that the treatment should be supportive and eliminative. In hospitals isolation should be enforced; in families the usual prophylactic measures are advised. Two of his cases were of the extra-tonsillar type; one was associated with syphilis; in another there was apparently a concurrent infection with the Klebs-Loeffler bacillus and the bacillus fusiformis and

spirillum; the other three showed the possibilities of contagion, and the advantage of early diagnosis and prompt therapeutic action.

Taccone reports two cases of Vincent's angina in children of ten and twelve years, and emphasizes the importance of getting rid of the false membrane. He advises removal by irrigation, using a liter of water at least under pressure as from an ordinary irrigator. This lavage with boiled tepid water should be repeated every three hours; it is unnecessary to make the fluid strongly antiseptic. The membranous patches may also be removed with a cotton wad dipped in ether-iodine solution. By gently twisting the cotton the patch comes away without eroding the tissues beneath. The moment the patch has been removed, the region beneath must be sterilized with some strong antiseptic. He prefers hydrogen dioxide, undiluted for this, but some use salicylic acid, potassium permanganate, copper sulphate, or salvarsan, for this local treatment.

Stark thinks Vincent's angina is far more common than generally supposed. The diagnosis is difficult in gross lesions, and in suspected cases there should be an examination microscopically for the combined spirochetes and fusiform bacilli. Sodium perborate has given him uniformly good results. It is a simple remedy, without danger, will ease pain promptly, and cures within a short space of time.

In the opinion of Richardson, the treatment indicated in the tonsillar form is to promote drainage from the affected crypt, to keep the ulcer clean, and apply a twelve per cent solution of silver nitrate. Trichloroacetic acid in full strength has been employed with great success. Iodine is preferable only in cases in which the ulceration involves a large surface. Marvelous cures are reported from the use of salvarsan. The treatment in all cases should include prophylaxis and attention to hygiene of the month.

Favre and Dreyfous believe that while the lesions due to the fusospirillar symbiosis are at times primary, as in Vincent's angina and in certain cases of ulcero-membranous stomatitis, they are more often secondary to conditions lowering local resistance, such as dental caries, the inflammation resulting from eruption of a wisdom tooth or mercurial elimination, and various bucco-pharyngeal ulcerations, including syphilitic chancre. Though the treatment with organic arsenicals such as neosalvarsan and galyol is recognized as specific, they have found the combined silver nitrate and methylene blue treatment equally efficacious, simpler and less expensive. The ulcerations are carefully

cleansed every day with small swabs of cotton previously dipped in a ten per cent solution of silver nitrate in distilled water; the bases of the ulcers must be made quite clean regardless of the amount of bleeding induced. A one per cent methylene blue solution is then freely applied. In cases of Vincent's angina the tonsils are carefully examined and the recesses in the crypts, in which the infection often starts, duly explored. By the second or third treatment improvement is already manifest. The ulcer soon shows healthy, firm granulations. A one in thirty silver solution is thereafter sufficient, the treatment being continued until complete recovery has ensued. By this method disappearance of the most superficial lesions, as ordinarily noted on the internal surface of the cheeks, was procured in three days, and the more extensive tonsillar ulcerations, destroying nearly all the tonsillar tissue, in eight days. Where the treatment fails, the authors do not hesitate to affirm that some other morbid factor exists.

The following personal observations are interpolated not with the idea of presenting anything new, but to illustrate the confusion in clinical diagnosis which nearly always occurs in these cases, and the results of the treatment employed. So soon as each patient came under my care smears were made from the ulcerative lesions which readily clarified the diagnostic obscurity.

(1) Angina Vincenti chronica: A male, white, single, aged twenty-three, gave a history of "ulcerated sore throat" extending over many months. He was treated by the family physician for some time under the tentative diagnosis of tonsillitis and later stomatitis, but instead of disappearing the ulceration gradually progressed. A specimen of the patient's blood was then sent to a Louisville laboratory for examination, the doctor having suggested that the throat lesions might be syphilitic in character. However, there was no such history and the patient denied the possibility of exposure. The Wassermann blood test was reported as weakly positive, and the internal administration of antilutic medications promptly inaugurated, which resulted in considerable aggravation of the local lesions.

When the patient consulted me about three weeks thereafter, the ulcero-membranous lesions had extended from the tonsil forward to the buccal and lingual mucosa, the breath was very foul, gingivitis was present, and the cervical lymph glands were enlarged. The ulceration appeared clinically not unlike that due to syphilis, and the positive Wassermann made such a diagnosis plausible. Smears from the ulcerative lesions, however, showed the typical fusiform bacilli associated with spirochetes, thus establishing the diagnosis of Vincent's angina. No *treponema pallida* were found, but the smears contained organisms which were not positively identified, but were probably streptococci and staphylococci. The patient had become somewhat emaciated

because of his inability to masticate and swallow food without considerable discomfort; otherwise there was little evidence of systematic disturbance, the temperature and pulse rate being only slightly above normal.

After perfection of the diagnosis microscopically, the patient was given two doses of neosalvarsan intravenously at ten-day intervals. Potassium iodide, iron and strychnine were administered internally for several weeks. The ulcers were carefully cleansed daily by means of normal saline solution, and after gently removing the membranous patches and further cleansing with hydrogen dioxide the ulcerated areas were painted with silver nitrate solution 1:20. The lesions began to granulate within a week, hemorrhage became less at each treatment, and the patient returned to his home in the country perfectly well at the end of six weeks. The lingual lesions were the last to heal, which I believe is contrary to the experience of other observers.

A positive Wassermann blood reaction is unusual in Vincent's angina, unless the patient also has syphilis. In this case no history of lues could be obtained, nor was any evidence of the disease noted excepting the local lesions mentioned. In the absence of syphilis the Wassermann reaction in Vincent's angina is almost invariably negative.

(2) Angina Vincenti chronica: A female, white, aged twenty years, was referred to me by a local physician, with a note stating that he had been treating her two weeks for "tonsillitis" without improvement. According to the history this girl had suffered with "sore throat" for three weeks before consulting her physician. Household remedies had been used in the meantime without beneficial effect, and not until she discovered a few "patches" on the posterior lingual and buccal surfaces did she seek medical aid. The physician had evidently accepted her diagnosis of tonsillitis without making an examination.

When the patient came to me both tonsils were extensively involved, the left being partially destroyed, her breath was fetid, but there was no ulitis present. There were several painful lesions upon the posterior lingual and buccal mucosa. The pharyngeal tissues were markedly edematous, which rendered deglutition difficult. During the five weeks' illness the patient had lost fifteen pounds in weight; no symptoms of toxemia were present; pulse and temperature about normal. Wassermann blood reaction negative. Smears from the ulcerated surfaces showed typical Vincent's organisms.

In the local treatment of this case, after preliminary daily cleansing and removal of the membranous exudate as already described, trichloroacetic acid in full strength was applied during the first week. There was considerable bleeding from the left tonsillar area which was the site of greatest ulceration. Improvement being slow under this method of treatment, silver nitrate 1:20 was substituted, and complete healing occurred within four weeks. Neosalvarsan was not administered in this case, but otherwise the internal treatment was the same as in case one.

(3) Angina Vincenti acuta: I was recently called in consultation to see a boy of eight years, expect-

ing to perform intubation or tracheotomy. The child had been confined to bed only three days with what was supposed clinically to be diphtheria, and upon that basis antitoxin had been administered according to the routine practice. Microscopic examination of the exudate had not been made. The child did not improve, edema and swelling rapidly increased, deglutition became almost impossible, and respiration was obstructed. Examination of the throat was unsatisfactory because of the intense pain and edema.

The child seemed critically ill, and was taken to the hospital at once. Smears were obtained from the throat which under the microscope showed the fusiform bacilli associated with spirochetes, the picture being typical. No Klebs-Loeffler bacilli were found. Under cold applications the swelling began to subside within a few hours, and no further thought of operative intervention was entertained. Several doses of morphine had to be administered hypodermatically to promote physical comfort and quietude. The local measures described in the foregoing were pursued in this case, with some modifications owing to the age of the patient, and complete recovery ensued within two weeks.

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HEALTH INSURANCE AND MILITARY SERVICE.

There is one fact which stands out in the statistics of countries which have longest had health insurance, viz., the increasingly vigorous condition of those who are subject to military service compulsion, as compared not only with the condition of such in other nations—such as the United States, as our selective draft examinations reveal—which have not had the benefit of health insurance. The statistics of the countries, that have longest enjoyed the benefits of health insurance, show a steadily progressive improvement, also in this regard. This must be due in large part to such insurance, which has protected the families of workmen in these countries, has taught sanitation, hygiene, care of mother and children and provided promptly and freely the necessary medical help and medicines in times of sickness.—MILES M. DAWSON in *The Public Health Journal*.

PROGNOSIS IN SURGERY OF THE AGED.
BASED ON 100 PERSONAL CASES.*

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Of the patients operated upon by me during the four years to August, 1917, in hospital and private practice, I have selected one hundred cases to illustrate some remarks on the surgery of old people. While making the study, the thought uppermost in my mind has been the operative prognosis.

A summary of the table of 100 cases shows the number by decades to be: 50 to 59 years, 22; 60 to 69 years, 49; 70 to 79 years, 27; 80 years and over, 2. Extremes of age, 50 to 86, with an average of 62 years. Sex: Male, 65; female, 35.

Anesthetic employed: Ether or chloroform, 57; nitrous oxid gas and oxygen, 7; local, by novocain, 36.

Result: Recovered, 88 cases; died, 12, an operative mortality of 12 per cent. Of the twelve fatalities 8 were males and 4 females. Their extremes of age were 63 to 81 years with an average of 70½ years. The anesthetic employed in 9 of these was general, in one gas and oxygen and in two local. The operation was *imperative* in ten cases and *elective* in two (herniae). The operation was for malignant disease in four of these cases.

Comment on the chart is as follows:

Herniae: One, aged 69, ether anesthetic, died of pulmonary oedema on second day after operation; one, aged 68, ether, died on the seventh day; and a third case, umbilical hernia in a woman, aged 75, incarcerated one week, strangulation and peritonitis present at time of operation, gas and oxygen anesthesia, succumbed two hours after operation.

Empyema of gall-bladder: Man, aged 69, general anesthetic, septic at time of operation, died on fourth day.

Carcinoma of esophagus: Man, aged 70, weakened from starvation, died second day after gastrostomy under local anesthesia.

Cancer of stomach, aged 63, died from exhaustion after gastrostomy:

Cancer of rectum: Perineal extirpation on five cases, palliative colostomy on two radically inoperable cases.

Carcinoma of uterus: Operation, June, 1915, no recurrence to date.

Extensive carcinoma of breast: One, aged 76, ether anesthesia, palliative operation, died fourth day, pneumonia.

*Read before the Surgical Section, New York Academy of Medicine, October 3, 1917.

Cancer of pancreas: Exploratory operation. Recovered but died later of the cancer.

Cancer of hand and arm: Aged 60, local anesthesia, amputation above elbow, primary union and no recurrence.

Sarcoma of neck: Huge tumor. Died suddenly four hours after operation, probably from embolism.

Syphiloma of liver: Aged 68, ether, died 20th day, exhaustion.

Thyroidectomy: Aged 79, novocain locally, died third day, myocarditis.

Pyloric obstruction (fibrous): Operated by another surgeon 15 months before for adhesions. I did a gastro-enterostomy four years ago. Patient is now alive and well.

Necrosis of jaw: One-half of mandible removed.

Dislocation of humerus: First case—resection of head of humerus for old dislocation and adhesions. Complication—dislocation of ulna. Result—fair function and relief of pain.

Second case: Fracture—dislocation of head of humerus. Head removed. Result good.

Amputation through thigh: Nine amputations were for gangrene of foot; eight senile, one diabetic. Tenth case was for extensive necrotic ulcer of leg, eleventh for necrosis of bones of foot and ankle. Ten recovered. One, aged 81, died on 12th day—vessels of thigh thrombosed at time of operation.

Prostatectomies: All four were suprapubic, one in two stages. One, aged 64, died second day of pneumonia. The other three obtained good functional results.

The operation on the majority of the 100 cases reported was rendered extrahazardous by organic neurological lesions (paralysis, etc.) and other complications (cardiac, pulmonary and renal), which made these patients, from the surgical standpoint, much older than their actual years of life indicated.

Surgery of the aged is *imperative* or *elective*. In certain cases, as strangulated hernia, gangrene of the foot or empyema of the gall bladder, the surgeon has no choice, the call is imperative. In other cases operation is elective. Broad experience and sound judgment will be the best guides for the surgeon in presenting to the patient and his friends the probable outcome of operative procedure for, after all, the decision rests with them.

The indications for *elective* operation are (1) to effect a cure, as in carcinoma of the breast suitable for radical removal; (2) to prolong life, e. g., in the same mammary cancer that has become radically inoperable but where a partial operation will

diminish suffering and toxemia and delay the fatal issue, and (3) to relieve pain and incapacity as in a large ventral hernia.

Occasionally a physician advocates the application of the Spartan system to the aged. Osler outdid the Greeks in abridging the Biblical span of man's usefulness by a decade. History refutes all such arbitrary rulings and limitations in the monumental achievements of the elders in the fields of science, statesmanship, literature and art. The fact is that the extremes of age have furnished many examples of the precocious youth and the venerable sage. Personally I incline to the philosophy of Cato the Elder as set forth in *de Senectute*. While the mind retains its vigor, excruciating pain alone would offer the only excuse for interference,—and what pain cannot Morpheus control till the flickering candle burns out? Euphoria rather than euthnesia should be the guiding star of the surgeon.

It is trite but true that a man is as old as his arteries.

From the surgical viewpoint he is also as old as his heart, kidneys or lungs. Chronic valvular disease of the heart, when compensated, does not contraindicate operation but a fatty or degenerated myocardium bars general anesthesia. The blood pressure reading is so variable as not to be a valuable guide. A trace of albumin and an occasional hyalin cast are not significant but fatty and epithelial casts oppose general anesthesia. Chronic bronchitis is apt to develop pulmonary oedema after ether or chloroform, but this is circumvented by the use of gas and oxygen or local anesthesia.

Aged fat and flabby individuals are poor surgical risks, as are operations which heal by suppuration and granulation.

Preparatory treatment.—The patient must not be weakened by underfeeding nor depleted by drastic catharsis. The drinking of water is to be encouraged to fill the blood vessels and flush the kidneys. The skin of the operative field, often thick and scaly in old people, must be carefully prepared to prevent infection. Irritated areas are relieved by a few days application of equal parts of corn starch and zinc oxide ointment.

Anesthetic.—The anesthetic of choice in all cases is local by novocain, one-half per cent., as was employed in 36 per cent. of this series of cases. The second choice, especially in the presence of pulmonary irritation, is nitrous oxide gas and oxygen. This is particularly suited to severe but brief operations, as the amputation of limbs. Next comes chloroform, in the hands of an expert, and finally ether. Local anesthesia is always to be preferred when

practicable in both major and minor operations on old people. Broader experience overcomes its apparent handicap to the surgeon and its more general use will, beyond question, result in the saving of many lives that would succumb to a general anesthetic.

When a general anesthetic is to be administered, the plan I have followed to shorten its duration is to have the operative field in readiness to begin the operation the instant the patient is fully narcotized. The patient is placed upon the operating table, the field of operation is prepared with iodine and covered with a sterile towel and the patient draped before beginning the administration of the anesthetic. These preliminaries save the patient many valuable minutes, and time is precious in the surgery of the aged.

When amputating through the thigh in old people I do not use the Esmarch bandage or a tourniquet. The vessels are clamped as encountered and then divided. In cases of gangrene especially, thrombosis is apt to be present, and amputation, to be successful, must be proximal to the point of occlusion.

I employ morphine and atropine as a preliminary to local anesthesia but recently have abandoned this medication before general anesthesia in the aged, for it delays the reaction from the operation and increases shock.

Five cardinal rules for successful surgery of old people are:

1. A correct diagnosis made by thorough and, if necessary, repeated examinations before the operation.

2. A definite plan of operation, executed with the greatest celerity compatible with safety.

3. Rigid asepsis, for the powers of resistance to infection in the aged are limited.

4. Control of haemorrhage by the Esmarch bandage, posture, segregation and by division of vessels between clamps, for blood lost is not quickly replenished in old people.

5. Careful handling of tissues. Trauma of tissues results in diminished resistance and favors infection. "Quickly in and quickly out" is imperative when invading the abdominal cavity and with the least possible evisceration.

Furthermore, the body heat must be conserved by warm covering during the operation and protection thereafter, including the avoidance of drafts.

Good nursing and nourishment are essential to rapid convalescence and early sitting up to prevent hypostatic pneumonia.

The safeguards against shock are a definitely

planned operation, short anesthesia, deft technique, "bloodless surgery" and conservation of body heat.

Favorable prognostic factors in surgery of the aged may be thus stated:

First: Physically the very old represent the survival of the fittest or, if naturally delicate, they have not undermined their constitution by dissipation or excess.

Second: Abstemious habits of eating and drinking and a routine life are accompaniments of advancing years, hence post operative toxemia and delirium tremens are less frequent complications than in younger people.

Third: The general condition of the patient will be of more weight in deciding the operability of a given case than any slight deviation from the normal of a particular organ as the heart, the kidney or the lung.

Fourth: The selection of the anesthetic suitable to the patient's condition and to the proposed operation will frequently be a more potent factor in the prognosis than the surgical procedure itself. In major operations under general anesthesia the responsibility of the anesthetist is on a par with that of the surgeon. The more frequently local anesthesia or gas and oxygen can be employed, the better the prognosis.

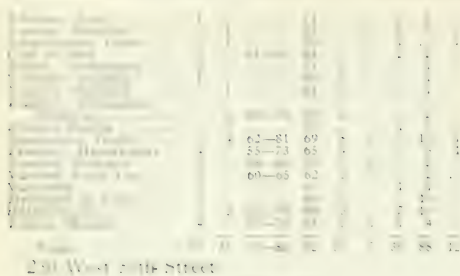
Fifth: In cancer cases the liability to recurrence after radical operation diminishes with advancing years, and after palliative operations malignant growths are retarded for longer periods than in younger subjects with their more active tissue changes.

The observations made from our experience justify the conclusion that:

Imperative operations must be performed irrespective of the age of the patient and that,

Other things being equal, in elective cases, age *per se* is not a bar to successful surgery.

Diagnosis	Sex		Age		Anesthetic				
	Male	Female	Under 50	Over 50	General	Gas and Oxygen	Local	Regional	Unanesthetized
Hernia:									
Inguinal	1	1	54-71	1	1	1	1	1	1
Ventral	1	1	54-71	1	1	1	1	1	1
Femoral	1	1	54-71	1	1	1	1	1	1
Abdominal	1	1	54-71	1	1	1	1	1	1
Chest	1	1	54-71	1	1	1	1	1	1
Groin	1	1	54-71	1	1	1	1	1	1
Cancer of:									
Oropharynx	1	1	63-69	1	1	1	1	1	1
Stomach	1	1	63-69	1	1	1	1	1	1
Rectum	1	1	63-69	1	1	1	1	1	1
Bladder	1	1	63-69	1	1	1	1	1	1
Prostate	1	1	63-69	1	1	1	1	1	1
Pancreas	1	1	63-69	1	1	1	1	1	1
Liver	1	1	63-69	1	1	1	1	1	1
Gall Bladder	1	1	63-69	1	1	1	1	1	1
Spleen	1	1	63-69	1	1	1	1	1	1
Adrenal	1	1	63-69	1	1	1	1	1	1
Thyroid	1	1	63-69	1	1	1	1	1	1
Parathyroid	1	1	63-69	1	1	1	1	1	1
Pituitary	1	1	63-69	1	1	1	1	1	1
Hypophysis	1	1	63-69	1	1	1	1	1	1
Hypothalamus	1	1	63-69	1	1	1	1	1	1
Hypophysis	1	1	63-69	1	1	1	1	1	1
Hypothalamus	1	1	63-69	1	1	1	1	1	1
Hypophysis	1	1	63-69	1	1	1	1	1	1
Hypothalamus	1	1	63-69	1	1	1	1	1	1
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GONORRHEA IN THE FEMALE.*

EDWARD F. ZIEGELMAN, M.D.

PORTLAND, OREGON.

The title "Gonorrhea in the Female," is a topic which may be open to criticism because of its supposed simplicity of diagnosis and treatment; in my opinion, however, it is one of the most important with which the specialist or general practitioner has to contend—one which has a tremendous bearing upon the happiness and welfare of the general public.

In 1872 Emil Noeggerath published a work on gonorrhea that was destined to revolutionize the view of the medical world regarding the clinical significance of the disease—especially of gonorrhea in the female. He was the first man to insist that inflammation of the uterus and appendages was the direct result of gonorrhea and that gonorrhea was extremely intractable to treatment, that it often remained latent for months or years before causing severe complications, and that infection as a result of sexual intercourse might occur after long periods of quiescence. Some authorities are extremely pessimistic concerning prognosis, and while personally I am not of the ultra-pessimistic type regarding the treatment of gonorrhea in women I am extremely careful in making the statement that an individual patient is absolutely cured of her infection. I have come to these conclusions from my work in hospitals, dispensaries and private practice. In institutions and dispensary practice the difficulty is summed up in lack of control; and, whereas we are supposed to have our private patients under greater control than our institutional patients so far as chronic diseases are concerned, the patient who visits our office will, before a cure is completed, generally lose patience, or the symptoms becoming nil she feels that she is cured and ceases to make the necessary visits to our office.

The presence of the gonococcus is proven only when the cocci are found in characteristic group-

ings in leucocytes, when there is a chance for counterstaining by the Gram method, and when the organism under suspicion corresponds morphologically with the gonococcus. There are numerous bacteria staining Gram negative but only three organisms other than the gonococcus must be differentiated. They are the micrococcus catarrhalis, micrococcus melitensis and the meningococcus. The catarrhalis and the meningococcus are very similar morphologically but fortunately are seldom if ever found in the female genital tract. Nevertheless, when a positive diagnosis is required, either for sociological or medico-legal purposes, other means than staining have to be resorted to. For these cases culture offers a method of absolute certainty in diagnosis; but the use of the culture method, unless performed by a skilled bacteriologist, is useless, as the gonococcus is an extremely difficult organism to grow.

Gonorrhea is usually contracted through sexual intercourse, though there are numerous authentic cases showing that patients have been contaminated through dirty instrumentation and by way of soiled towels. These latter infections are rare, due to the fact that if the gonococcus is exposed to room temperature or allowed to dry it loses its virulence or perishes within a few hours.

In examining a suspected case of gonorrhea in the female anamnesis is of particular importance. Especial attention should be directed to the menstrual history, inquiries being made concerning changes in the character of the flow and the development of a dysmenorrhœa. Inquiries should be instituted concerning the existence of vesical irritability, frequency of urination, dysuria and cloudiness of urine, as frequently a gonorrheal cystitis is present. The possibility of previous attacks of pelvic peritonitis as well as dyspareunia and painful defecation should be inquired into, and to impress upon you the importance of this let me refer you to the chart where you will see two cases of gonorrheal proctitis as sequelae. If the patient be a married woman great tact must be used, and the questions should be entirely free from all suggestion of marital contamination, though under no circumstances should the patient be left in ignorance of the infectious nature of her disease. On the other hand, care must be taken not to arouse suspicion of marital infidelity in a case that might possibly be the result of an extra-genital infection. No rule can be laid down to govern all cases; common sense is a prime requisite, and an endeavor should be made to have the husband consult a genito-urinary man, as it is absolutely futile to attempt to

cure a gonorrhea in a woman whose husband is afflicted with a neglected or chronic urethritis or other form of Neiserian infection and who is continually reinfecting his wife.

Accurate statistics relative to the period required for the incubation of the gonococci in women are obtained with difficulty, as the initial symptoms of this disease in the female are often so slight and of so insidious or transitory a character that the actual date of onset is difficult of definite determination; as a further hindrance the onset is as a rule so mild that the physician is rarely consulted until the disease has made considerable progress; in fact, when the infection is confined to areas below the internal os it is not uncommon for patients to be in ignorance of the existence of the disease.

The anatomical structures in the female most frequently involved that can be reached by treatment other than operative are the urethra, Bartholin's glands, the glands about the vestibule, the cervix and, less often than the others, the vagina, unless the patient is a child.

In an extension of the disease above the cervix it extends by direct continuity along the endometrium and along the mucosa of the tube. The most frequent pathological condition produced by a gonorrheal infection of the tube is a pyoendosalpingitis. Gonorrheal lesions of the Fallopian tubes possess certain characteristics which, while not sufficiently absolute to prove the etiology of the infection, are pronounced enough in the great majority of cases so that we may be moderately certain of the type of infection present. The fact of the extension of the gonococcus along the surface mucosa produces certain macroscopical pictures that are more or less characteristic, whereas pyogenic micro-organisms reach the tubes by way of either the blood or lymph vessels of the broad ligament, the mucosa is not primarily involved. In these infections various abscesses and cellulitis are common, while from the very nature of the gonococcal infection these structures are far less frequently involved. When the end of the fimbriated extremity of the Fallopian tube has not been closed through the inflammatory result of the primary gonococcal infection, which is rarely the case, the ovary may become infected secondarily, a perioophoritis resulting. When the substance of the ovary itself is infected the most frequent route of infection is through a recently ruptured follicle. Such ovaries are rarely larger than a hen's egg and are often but slightly increased in size. During the chronic stage sclerotic changes are common, and the ovary may be even smaller than normal. As a rule multiple retention cysts are present, and a frequent ter-

минаl result of a gonococcal infection of a tube is a hydrosalpinx.

The symptomatology when you see your patient early is that of an acute inflammation depending upon the anatomical structures involved, and as we often have only Bartholin's glands, the vagina and cervix involved many women have no symptoms of a urethritis. The type known as the honeymoon gonorrhea, where the gentleman out of courtesy to his young wife does not wish to cause her pain and does not rupture the hymen at the first intercourse, is usually the most extensive infection we find in women, as the infectious semen is deposited at the orifice of the urethra and at the opening of Bartholin's glands. As a result there are acute vestibular gonorrheal urethritis and Bartholinitis. The condition of course causes considerable pain and intercourse ceases. If a woman were seen in this condition by a competent physician she could easily be treated and the spread of the disease prevented. But nine out of ten of these patients do not consult a physician on account of a sensitive modesty. As a rule they employ douches and carry the infectious material in this way from the outside into the vagina and thus transfer the disease to the cervix with subsequent great possibility of internal tubal trouble.

The diagnosis is usually suspected by the clinical symptoms and visual pathology, but should be corroborated by examination of smears, especially in the subacute cases. Personally I find that collecting the material from the urethra, right and left Bartholin's glands, the vagina and the cervix with a medicine dropper gives a greater percentage of positive results than either with a cotton swab, platinum loop or glass rod. In chronic cases obtaining smears from Skene's ducts and from the cervix after the use of a dull curette is most important. These smears are all stained according to the Gram method. The usual pelvic examination is made to determine any adhesions or disturbances of the tubes. Should the smears prove negative I believe the complement fixation test in a great many cases gives a clue to the causative factor if a definite pelvic pathology is present, and where bacteriological examination has failed. In virgins the use of an endoscope has proven invaluable as a means of obtaining a smear from the vagina or cervix.

It is a well-known fact that a female gonorrhoea can transmit infection at one time and not at another. She is more likely to produce an infection directly after a menstrual period. The reason for this has never been satisfactorily explained, but my belief is that since the ideal culture medium is blood

serum a natural growing medium is produced during the menstrual period. At least this seems plausible. This most likely causes a multiplication and—possibly—an increased activity of hidden organisms.

After the clinical symptoms of gonorrhea have subsided all patients should be subjected to a thorough bacteriological examination. In private practice I insist on three negative smears to be followed by two negative smears after the next menstrual period. In children five negative smears must be obtained. In the case of unmarried women instructions are given to return for urethral examination when contemplating matrimony or on the first appearance of any symptom suggesting a recurrence of the original condition. In the case of married patients the greatest care should be exercised to obtain a complete cure before the marital relation is resumed.

The genito-urinary men of the present day who limit their practice almost exclusively to the treatment of gonorrhea in males are very much in advance in their methods over those practitioners to whom the women come for treatment of their gonorrhea and its complications. Unfortunately the treatment of gonorrhea in the female is confined almost entirely to the general practitioner; this condition of affairs has not led to much advance in our treatment of their troubles.

Treatment depends entirely upon the stage of the disease. In acute stages practically all that is demanded is absolute rest, light diet, particularly about the time of the menstrual period. Great care should be exercised in preserving cleanliness not to transfer the infection along the genital tract beyond the point of origin. Chronic cases require much patience on the part both of physician and patient. The silver salts are the favorites of most authorities. In the treatment of the urethra the endoscope is invaluable. I have found that Skene's glands are best treated by the actual cautery. The glands of the vestibule also yield much more readily to this form of treatment. Infection of Bartholin's glands can usually be satisfactorily treated by injection of silver salts, using a blunt-pointed needle—one similar to a hypodermic—and inserting same into duct. There are cases requiring a dissection of the gland—a procedure not so simple as one might think. Linear cauterization, after the method of Boldt,² has proven very satisfactory in treatment of the cervical canal at intervals of every two weeks, though I believe in the hands of experienced plastic operators a resection of the cervical mucosa after the

Schroeder method gives the most satisfactory results.

According to the best authorities a gonorrheal endometritis seldom if ever occurs; I am frank to say I have never seen such condition. I draw this conclusion from the microscopic study of uteri removed from women who have had a gonorrheal infection. Numerous sections have been stained for the gonococcus in situ and I have yet to see an endometrial section showing the same or evidence of endometritis. On the contrary there are authorities who contend such conditions exist and they advocate curettage and application of silver preparations. I have always held that such procedure was unwarranted, not to say dangerous, because of the great liability of lighting up a previous infection or adnexal disease. If a true gonorrheal endometritis ever does exist it can be treated in conjunction with the tubal condition.

Treatment of the tubes and ovaries should be conservative: by rest in bed, light diet, hot vaginal douches, hot or cold applications over the pelvic region. I have occasionally found the use of stock vaccines to be beneficial—contrary to the statistics of most men. Operative procedure on acute gonorrheal pus tubes—either salpingectomy or salpingostomy—is unwarranted; first, because it is against one of the basic principles of surgery, i. e., the conservation of tissue, and second, the drainage procedure must necessarily tend to increase one of the most dreaded sequelae of abdominal surgery—adhesions. If drainage in gonorrheal tubes must be done the most logical procedure and route, in my opinion, is per vaginam.

Regarding conservative or complete surgery in these cases, one must be guided by the particular conditions which he meets. He should explain to the patient that conservative surgery may mean future pregnancies, or perhaps future operative procedure.

Whether one should, in radical surgery, do a supra-vaginal or a pan-hysterectomy will depend on the condition of the cervix at the time of operation. I personally believe that conservative surgery on the tubes and radical surgery on the cervix is the ideal procedure.

To impress the importance of the subject and the difficulty of making a relatively positive cure based upon bacteriological and serological examinations I call attention to the following case reports:

(1) Gonorrhoea in women, contrary to the belief of many, is one of the most difficult of diseases to cure.

(2) It requires unlimited perseverance on the

partial blindness and the explicit confidence of the patient.

(3) It requires in many cases surgical skill and judgment.

(4) If we hope to control this disease and obtain results all infected women must be under civil jurisdiction, or subject to same, and if necessary public clinics with salaried attendants should be provided.

(5) A cure must be determined only on bacteriological and serological examination; not on amelioration of symptoms.

(6) If it be remembered that occasionally the source of a focal infection is the genital tract a few patients will still remain in possession of their good teeth and tonsils.

(7) Do not fail to insist that the husband (or paramour) consult a competent andrologist, since it is useless to treat a female gonorrhoeic who persists in having intercourse with an infected man.

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MEDICAL SCIENCE.

The highest function of the physician is still the relief of human suffering, not merely to drug his patients, but to care for them; and, as the surgeon must know how to think clinically, the clinician to think surgically, at need, so it is possible that, some day, the word "cure" will, as part of the same Hippocratic ideal, be restored to its ancient meaning (curare). Meanwhile, it is recognized that the whole medical science includes its parts, is greater than its practice, applies to the ills of society as well as human ailments.—FIELDING H. GARRISON, M.D.

OBLIGATORY HEALTH INSURANCE.

Workmen's health insurance is like elementary education. In order that it shall function properly it needs must be universal, and in order to be universal, it must be obligatory. In regard to obligatory military training it has been said that what America most needs to-day is a higher appreciation of obligation, and that without it we shall ever be a drifting, weak, and inefficient nation. The case for compulsory health insurance is, however, far clearer than that for compulsory military training. In health insurance, as in education, we are dealing not with obligatory burdens, but with obligatory benefits.—IRVING FISHER, in *The Public Health Journal*.

THE ETIOLOGY AND PATHOLOGY OF SINUS THROMBOSIS.

A REVIEW

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In the study of thrombosis, regardless of the anatomic situation in which it may occur, it is well to remember that there has hitherto been more or less confusion and misunderstanding concerning employment of the terms thrombosis, embolism and phlebitis, evidently because of existing erroneous impressions as to the actual significance of each. The pertinent fact appears to have been overlooked that the three words have separate and distinct meanings, and therefore under the widest interpretation cannot be correctly used interchangeably or synonymously.

Thrombosis signifies an existing obstructive clot in some portion of the circulatory apparatus. This may remain indefinitely in its original situs, it may sooner or later be resorbed, or it may disintegrate and thus reach the general circulation. An embolus is a minute particle of material, such as blood clot, fat, fibrin, tissue, etc., which having entered the blood stream in one situation is transported to another and by its lodgment there produces obstruction. In other words, the formation of an obstructive cloth which remains at its original situs is technically a thrombus; whereas a detached particle transported to another situation, and there lodging and producing obstruction, becomes an embolus.

The term phlebitis has frequently been used by various authors to represent both thrombosis and embolism. It is recognized that thrombotic obstruction may occur at the site of venous inflammation, but in that event the correct pathologic designation would be thrombo-phlebitis. It must not be forgotten that the word phlebitis can signify only inflammation of a vein, and that neither thrombosis nor embolism necessarily owes its origin to venous inflammation. While instances are not uncommon where the following sequence has been observed: (a) phlebitis, (b) thrombosis, and (c) embolism,—yet the fact remains that more or less extensive phlebitis may exist without producing either thrombosis or embolism, and vice versa.

So far as can be ascertained the earliest medical writer to attempt elucidation of the etiology of thrombus development was Hunter (1793), who advanced the hypothesis that blood changes were invariably responsible therefor. Since then the supposed etiologic factors have become nearly as nu-

merous as there are writers on the subject who have indulged in theoretical speculation. While there is yet no consensus of etiologic opinion, it may be said with some assurance of correctness that primarily thrombosis or obstructive clot within a vein is dependent upon factors which produce coagulation of at least a portion of the blood stream. Something must first occur to cause slowing of the current, otherwise the development of a thrombus would be impossible.

Several factors are to be considered, such as roughness of the inner wall of the vein, mechanical injury which may be operative or otherwise, followed by inflammation of the vessel, and its surroundings due to infection of high virulency. The theory that infection is necessary to thrombotic development, which was advanced by Welch (1899), is generally accepted as being correct. Kratz states the most important conclusion to be drawn from his post-mortem material is that he never failed to find an associated infection in embolism of the pulmonary arteries. On the contrary, however, it has been demonstrated that post-operative thrombosis and embolism may occur in the absence of demonstrable infection. Baumgarten has shown that a vessel may be ligated without the production of thrombosis, and necessarily on each side of the ligature the current is not only slowed but is stagnant.

In my opinion the classification of thrombosis as given by Hektoen several years ago has never been improved upon:

(1) Thrombosis from adhesion: (a) on foreign bodies, (b) on the inner surface of vessels the site of necrosis, fatty degeneration, or inflammation.

(2) Thrombosis from stagnation: (a) from local disturbances, from ligation, compression, circumscribed dilatation, (b) from general circulatory weakness.

(3) Thrombosis from fermentation: (a) due to destruction of blood corpuscles, (b) due to the introduction of ferments formed outside of the vessels.

The elements which enter as seeming factors in the creation of thrombi give the color from which the various types derive their names. According to the proportion of blood plates, leucocytes, and erythrocytes, thrombi are classified as white, red, or mixed; between these there may be intermediate forms, as the quantity of each of the forming elements varies.

The white thrombus develops most frequently in the arteries and cardiac cavities, and represents the

Schimmelbusch theory of marginal location of leucocytes and blood plates organizing about a roughened intima or injured area, and thus the nucleus of a white thrombus is created. When this thrombus extends into the blood stream, accretions of erythrocytes occur as it approaches nearer and nearer the axis of the stream, thus producing a mixed thrombus. In stagnation or quiet blood, when the conditions are favorable for its development, as in systematic venous areas, the red thrombus develops. In the capillaries and smaller vessels, the first receivers of the body juices, in marantic and cachectic conditions, the hyaline type of thrombus forms. The latter variety is, no doubt, a true fibrin, as it reacts to the Weigert method of staining.

Thrombi retain their original form a brief time only. Five chief changes occur in their structure: Hyaline and granular transformation, substitution with connective tissue, calcification, simple softening and septic disintegration, or transference as a mass or part into a near or distant vessel as an embolus. (Hektoen.)

Crouse claims there is no one factor that can explain a thrombotic development, for such a complication in either a medical or surgical case may be due to many different conditions: (a) vessel wall changes, (b) blood changes, (c) anatomical peculiarities of certain regions, (d) mechanical irritations, and (e) infective conditions of vessels, blood and system.

After the formation of a thrombus there may be organization and vascularization of the connective tissue elements with recanalization, or the fibrin and leucocytes may disintegrate forming a fluid mass which is transported into the general circulation. Calcification of the thrombus may occur, thus forming phleboliths. When the thrombus becomes infected, and there is no drainage through a sinus or by destruction of the outer venous wall, "purulent softening" usually supervenes. Extension of the thrombus may occur from its more or less sterile ends, but when the softening overcomes this safety valve, then resultant pyemia, metastatic abscess or septic meningitis promptly closes the scene.

The most common type of thrombosis encountered in our line of work involves one or more of the sinuses, and is usually attributable to acute infection of the mastoid cells. It begins in the sigmoid portion of the lateral sinus from which it may extend with or against the blood stream. Cases have been reported in which there was evidence of extension backward into the torcular Herophili, and

the lateral sinus of the opposite side. It may also extend into the superior or inferior petrosal, into the cavernous sinus, and into the ophthalmic vein.

Cavernous sinus thrombosis may have as its etiologic factor any infected area drained by the ophthalmic vein. It may result from pustules upon the face, within the nostrils, upon the eyelids; from purulent infection of the accessory sinuses, or the pharyngeal and buccal cavities; facial erysipelas may also be the cause.

Some of the authorities give credit to the streptococcus for two-thirds of all infected thrombi, and one-third to the staphylococcus. Gruening found pure culture of the streptococcus in six consecutive cases of thrombosis of the lateral sinus.

The experimental observations of Stenger on dogs may be summarized as follows. Introduction into the sigmoid sinus of highly virulent streptococcus cultures by four methods:

(1) A tampon with the culture laid on the sinus wall;

(2) The culture carried along the sinus wall;

(3) Injection of serum into the sinus with a syringe;

(4) Scratching the sinus wall and placing upon it an infected tampon. The last method was the only one by which he was able to produce sinus thrombosis.

From the histologic investigations of Koster and Talker it would appear there occurred a gradually progressive disease of the vessel wall. The blood in the vein coagulated because of change in the tissue fluids, and bacterial infection then occurred. However, they concluded that infection was secondary rather than primary.

As illustrating the effect of injury to the sinus in an operation for mastoid disease in man, Dwyer reports a case of thrombosis following by metastatic abscess. Haymann was able to produce sinus thrombosis and pyemia in dogs and monkeys, and of his conclusions the following are abstracted:

(1) That the thrombi in the earliest stages may contain micro-organisms, or they may enter the thrombi subsequently;

(2) That a moderate number of micro-organisms do not prevent organization of the thrombus;

(3) That when experimentally infected the thrombus shows a marked tendency to spontaneous recovery.

This author also states that at times malignant forms show organization, vascularization and recanalization of the sinus. He reports the case of a

man who died from meningitis where the sigmoid was obliterated throughout a large area, being completely closed by firmly organized connective tissue with distinct evidence of beginning recanalization.

Friedenwald is of the opinion that the course of sinus thrombosis varies according to the virulence of the infection and other influences; that it may become organized without disintegration, and the lumen of the sinus re-established; that even in cases in which the center of the thrombus is purulent, the firm closure of the two ends and the formation of a fistula or destruction of the outer wall may permit of its successful drainage.

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HEALTH INSURANCE.

The North American continent has a very much larger proportion of physicians than any European country. It does not as yet boast of any perceptibly higher standard of health. Shall we assume that these standards are not affected by available medical facilities? Isn't this an admission that the medical profession is a useless burden? Or is the explanation to be found in the fact that for lack of proper organization the American people never utilized their medical facilities to their full capacity? Patients without medical aid on one hand—doctors who have nothing to do, on the other. When health insurance brings these two together, we may find that one doctor for every 700 population is not too much, and that every 700 population can afford through collective effort to support a warden of their health, as it will support more than one teacher, minister or lawyer.

Health insurance is not a panacea. Nor is it a secret remedy. It does not promise to accomplish anything that could not conceivably be accomplished in other ways. But it is a simple, practical, common sense, widely tried out, method of marshalling the financial and medical resources of a civilized community in the fight against the vicious circle of circumstances, under which disease breeds poverty and poverty breeds disease. Surely the medical profession cannot afford to be registered in an attitude of opposition to this social reform.—I. M. RUBINOW, in *The Public Health Journal*.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, FEBRUARY, 1918.

THE CONQUEST OF GAS BACILLUS INFECTIONS.

As anyone, even superficially, acquainted with the medical problems that have arisen in this war, knows, one of the most serious is that of infection by gas-producing bacilli. The long cultivated, fertile soil of northern France is rich with these bacteria; and the war literature bears abundant testimony to the desperate efforts of both French and English surgeons to combat these terrible infections. Thus far their efforts have been anything but satisfactory. Up to last year it was believed that all these infections were due to the gas bacillus described by Welch in 1891. Recently, however, a number of English and French observers have found that only about two-thirds of these infections were due to the *Bacillus Welchii*, while the remainder are due to the bacillus of malignant edema of Pasteur and the bacillus oedematis. Sometimes two or more of these bacteria are present in the same wound.

Thus far the only methods that have been available to oppose these infections have been mutilating surgery and the widespread use of powerful antiseptics. Many surgeons, in their desperation, advocate early amputation, recalling to us, in poverty of resource, the old pre-antiseptic days, when the amputation was considered the method of choice in compound fractures.

It seems strange that although we have been ac-

quainted with the cultural characteristics of the bacillus *Welchii* for over a quarter of a century, no attempt had been made to study its biological or immunological properties. It is another striking instance of the driving power of stern necessity that the solution of this hitherto neglected problem should bear promise and that we shall soon witness the control of this dreaded infection. Up to the time of the work of Bull and Pritchett, in the early part of this year, there were a number of theories as to the destructive power of the bacillus *Welchii*. Some observers believed that an acid product was formed, others held that there was a mechanical action due to the formation of a gas, while still others regarded the gangrenous condition as due to the pathologic actions of other organisms and that the Welch bacillus developed only after such conditions had been established.

Bull and Pritchett showed, however, that the solution of this mystery was extremely simple. They found that the bacillus caused a specific bacterial toxin, like diphtheria and tetanus bacilli and the bacillus botulinus. In other words, a toxin was produced that was entirely separable from the bodies of the bacteria themselves, i. e., an exotoxin, as opposed to an endotoxin. Now it is an oft-demonstrated truth in bacteriology that when a bacterium is found to produce an exotoxin, that an efficient antitoxin can be readily elaborated. This Bull and Pritchett demonstrated to their entire satisfaction in regard to the bacillus of Welch. By immunizing animals with bacteria-free toxin, an immune serum was obtained which has the power to neutralize the toxin both in vivo and in vitro. By numerous animal experiments these authors have shown that a prophylactic intravenous dose of antitoxin uniformly confers complete immunity for a period of at least two weeks against many times the lethal dose of toxin. Furthermore, they have shown the antitoxin also confers an active immunity; thus, if animals are injected with a virulent strain of the organism and the antitoxin is injected twenty-four hours later, the animal will recover. The authors have apparently not yet determined how long after the infection the serum will prove curative. Bull and Pritchett have also discovered that all the different strains of the bacillus *Welchii* produce the same toxin, so that we shall not be confronted with the problem that meets us with the pneumococcus, for example.

Thus far few observations have been made in human beings, but these have already shown satisfactory results.

We should not be surprised, therefore, that one

of the routine procedures for wounded soldiers at the front will be an injection of the Welch bacillus antitoxin, in addition to the injection of the tetanus antitoxin. If this dread infection becomes stamped out, we shall again be able to speak of one of the glories of American medicine. E. M.

EARLY BLOOD TRANSFUSION.

The importance of blood transfusion has been recognized but too often has it been regarded as a last resort. There has been far more discussion of the methods than there has been consideration of the time at which blood fusion is therapeutically most efficient or surgically most helpful. Major Robertson, *Annals of Surgery*, January, 1918, properly calls attention to the facts that blood transfusion frequently transforms the practically unoperable into safely operable patients, and that blood transfusion possesses a permanent resuscitative value of more significance than the mere counteracting of shock or the temporary relief of anemia.

The opportunities for blood transfusion in the Casualty Clearance Station are numerous. There is little time or facility to test the blood of the donor, either for syphilis or for hemolytic properties. The urgency of operation is sufficient warrant for taking all the chances that may be involved, because the death of the wounded patient is almost certain if the transfusion be not performed. The danger of operating upon a shocked and exsanguinated patient far outweighs the risk of harmful results due to hemolysis, acute dilatation of the heart from too rapid transfusion, or the transfused syphilis.

Major Robertson sounds a warning that one should not wait too long before transfusing, if operative treatment is indicated. There should be no unnecessary delay in employing the ordinary restoratives, including saline transfusion. The greater the degree of exsanguination, the less helpful is the transfusion, owing to the degenerative alterations in the tissues, quickly following after severe and continued hemorrhage. The relief of anemia decreases the liability of severe infection, wherefore blood transfusion as an early procedure possesses marked advantages.

In the presence of gas gangrene, its value is more limited, nor is it to be regarded as particularly serviceable unless the infected area can be completely controlled by surgical treatment or removed by amputation.

A marked loss of blood increases traumatic shock and the control of hemorrhage with the restoration of blood volume may determine the re-

covery of the patient. The blood pressure below 90 mm. Hg. suggests an unfavorable operative subject, while with a blood pressure below 70 mm. Hg. the patient's condition points toward fatality.

Col. Watson, commenting on the experiences of Major Robertson, points out that the exsanguinated wounded man is a regular habituate of military reception room.

Under these circumstances transfusion must pass from the category of last resort procedures into the field of first aid methods. Shock and anemia from hemorrhage may be counteracted by blood transfusion, which thus, incidentally, serves to decrease the likelihood of septic infection.

A knowledge of the theory, technic, instruments and methods of transfusion is of inestimable importance, even though there be no opportunity for the refinements based upon the study of the blood of donors. In the presence of an emergency, prompt action is the essential. The optimist surgeon will take his chance and transfuse new life and strength into the bloodless wounded; the less optimistic will lose valuable time thinking about the characteristics of the blood of the full-blooded donor, while the life of the exsanguinated victim rapidly ebbs away.

I. S. W.

MOBILIZING THE PROFESSION FOR WAR.

Until the entire medical profession of the United States, or at least that part which is mentally and physically fit and within the age limit, is mobilized within the Medical Reserve Corps of the United States Army, and not until then, the Surgeon General can not secure that efficiency which is so badly needed. He must have a free hand in the selection of medical officers from among the mobilized profession.

You may never be called, but by joining the Medical Reserve Corps and by placing your services at the command of your country, you clearly indicate the patriotism which the medical profession, as a whole, should evince and which must be manifest if we are to win the war.

Every doctor must realize that success depends upon a carefully selected and thoroughly trained body of medical officers. By careful selection, we mean the placing of a medical officer in the position for which he is best fitted. Only by having an immense corps or the entire profession mobilized upon a war basis, can we serve our country to the best possible advantage.

This mobilization should come from within the profession itself. Every physician coming within the requirements of the service as to age and physical fitness, should seriously consider the suggestion.

and without waiting for a conscripted mobilization, should apply at once for a commission in the Medical Reserve Corps of the United States Army.

It is not only for the combatant forces that medical officers are required, but for sanitation, hospital camps, cantonments and for other departments where the health and life of the forces are dependent upon the medical officer.

We have within the profession a sufficient number of doctors to meet fully the requirements of the Surgeon General's Office whatever they may be, but, to be of service, you must join the Medical Reserve Corps. Answer the appeal now being made for a large and efficient Medical Reserve Corps. Back up the Surgeon General. Support the Government. Put your patriotic preachments into practice. Harken to your nation's call. Doctors—more Doctors!—MacD.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

HOSPITAL HOURS.

The demand for increased speed and accomplishment in industry in order to meet the needs of a nation at war, has tended to break down many of the laws and ordinances protective of industrial workers. Inasmuch as modern warfare depends upon the faithful rear-guard at home as well as upon advanced guards in the trenches, it is imperative that the safeguards of labor should be carefully conserved. Increased production should be secured without an undue sacrifice of men and women, whose contributions to the production of the nation are essential for its success and safety.

Thus far the War Department has not issued definite orders, but the Chief of Ordnance and the Quartermaster-General have given suggestions and recommendations to be followed by arsenal commanders and manufacturers supplying their respective departments. They appreciate that the principles involved in the conservation of lives and limbs of the workers are thoroughly compatible with the most advanced ideas of industrial efficiency.

Reasonable hours of work, adequate working conditions and a proper scale of wages are necessary to secure the maximum output and, similarly, are necessary for preserving the optimum health. Ten hours labor should be the maximum for men, while an effort should be made to restrict the hours of working women to eight. The employment of women on night shifts should be prevented, while for men eight-hour shifts should be the maximum where continuous twenty-four-hour work is necessary.

One day's rest in seven should be a universal and invariable rule, while the half-holiday on Saturday is to be regarded as advantageous throughout the year, particularly if the work-day be ten hours long on the other days of the week. National and local holidays should be observed as a means of giving opportunity for rest, recreation and relaxation, which ultimately tend to increase productivity. Overtime is to be regarded, in a sense, as an industrial abuse which is to be minimized because of its inherent danger to workmen.

The application of these principles is a tacit recognition of the fact that the health of the workmen should be the primary consideration in the industrial world and that the Government regards health efficiency as conducive to industrial supremacy.

In marked contrast with these suggested regulations in industry are the hours deemed essential in hospital organization. The shortage of nurses, orderlies, and internes is recognized, but if laws compelled hospitals to observe time schedules such as are now demanded in industrial plants, a way would be found to meet such mandates. In some of the western States the eight-hour law was held to apply to nurses, and readjustments were made so that the law could be observed.

The great burdens and strains which are to be thrown upon hospital organizations as a result of military exigencies and the speeding up process in industrial spheres makes it important to consider the problem of time distribution among hospital workers. The value of trained, efficient hospital corps is greater than it has been for many years, and the reason, therefore, for protecting and safeguarding their health and welfare is most urgent. Hospital reorganization merits careful consideration with a view to preserving the health, comfort and happiness of those who are charged with responsibility of caring for the sick and the injured. Long hours of labor are as harmful in a hospital as they are in a factory.

AUTOMOBILE ACCIDENTS.

Vital statisticians are observing that while the communicable diseases have responded more and more each year to the measures instituted by health authorities for their control, injuries and fatalities resulting from the growing use of automobiles are steadily climbing. Where formerly diseases like typhoid fever, scarlet fever and others played an important rôle in mortality tabulations, fatalities due to the automobile are today as numerous as some of the serious infections.—L. FRANKEL, in *Medical Insurance and Health Conservation*.

Book Reviews

Practical Bacteriology, Blood Work, and Primal Parasitology, Including Bacteriological Keys, Zoological Tables, and Explanatory Clinical Notes. E. R. STITT, A.B., Ph.D., M.D., Medical Director U. S. Navy; Graduate, London School of Tropical Medicine; Head of Dept. of Tropical Medicine, U. S. Naval Medical School; Professor of Tropical Medicine, Georgetown University; Lecturer on Tropical Medicine, Jefferson Medical College; Member, National Board of Medical Examiners; Member, Advisory Board, Hygienic Laboratories; Formerly Associate Professor of Medical Zoology, University of the Philippines. *Fourth Edition*, Revised, Enlarged with 4 plates and 115 other illustrations, containing 505 figures. P. BLAKESTON'S SON & Co. \$2.00.

As an exceedingly valuable book, crowded with carefully arranged, tabulated, and concise information, this work has gone through four editions and deserves its popularity.

Part I. considers bacteriology. The technic of this subject is described clearly and briefly. Bacterial forms are grouped and classified according to a simple yet useful key system. Though bacteriology has become an enormous field of research and recorded facts, this small section somehow succeeds in including the important and essential facts. The work has been kept up to date, so as to include Petroff's medium for tubercle bacilli; isolation, Doehy and Avey's grouping of pneumococci, Rose-nov's studies on bacterial selective specificity.

The study of the blood constitutes Part II. of the book. Beginning with so simple a matter as country red blood corpuscles, the author has a helpful hint almost upon every item mentioned. The normal blood is described, the methods of its study outlined and the pathological blood pictures plainly illustrated and differentiated by text and figures.

Under Animal Parasitology (Part III), the author considers the various parasites which may infest the human body. Stitt has had a ripe and long experience in tropical diseases. He writes on the entire subject of parasitology from an evidently wide knowledge, and although this section contains but 137 small pages, it contains a truly large amount of accurate and valuable information.

Part IV. deals with clinical pathology. The newer blood chemistry in nephritis and diabetes are discussed, the best and accepted tests of cerebrospinal fluid, etc., etc. Last, there is an appendix with many well-arranged tabulations, technics for disinfection, for staining pathological sections, etc., etc.

This little book is a very welcome help for the practitioner and for the laboratory worker.

A Textbook of Pathology. W. G. MACCALLUM, Professor of Pathology in the College of Physicians and Surgeons, Columbia University, New York. Octavo, 1085 pages, with 575 illustrations, chiefly from drawings, by ALFRED FEINBERG. Philadelphia and London, W. B. SAUNDERS COMPANY, 1917. \$7.50.

The plan of Dr. MacCallum's book is quite novel. Instead of the conventional division into a general and special part, with a discussion of lesions under an anatomic classification, Dr. MacCallum, viewing all pathology as the response of the body against injury, expounds the subject from the point of view of the immediate or remote effect of each type of injury upon the various organs. Such an exposition is in one sense highly commendable, because it affords the student the only correct perspective of a pathological process. On the other hand, it permits of too many lacunae in the exposition; first, because the nature of the injury of many pathological conditions is unknown, and secondly, because there are certain lesions which cannot be ascribed as the result of an injury, in the strict sense of the term.

As a consequence, we find certain diseases classified under strange headings; for instance, we find Bank's disease under the head of diseases due to injury of the blood-forming organs, and hypertrophic pulmonary osteoarthropathy, under the heading of organs of internal secretion. Both these classifications are highly questionable. Dr. MacCallum, indeed, admits that his system of exposition has deficiencies, because he is forced to discuss blastomata under an entirely separate subdivision.

Apparently, Dr. MacCallum's main object in writing his book was that it should be pedagogic, for as a work of reference it has too many omissions. Nevertheless, it has other distinctive qualities which ought to make it extremely valuable, aside from the teleological aspect in which diseased phenomena are discussed. In the first place, Dr. MacCallum always keeps in mind that pathology is after all only an interpretation of clinical medicine. Instead, therefore, of the academic and detailed descriptions of lesions, as found in most text books, he always attempts to explain clinical phenomena in terms of the pathological lesions. In a large sense, the book is therefore a pathological physiology as well as a book on pathological anatomy, and contains a vast amount of good clinical medicine. In the second place, the book is of much value because the confines of our knowledge are so judiciously set forth. Dr. MacCallum is rarely categorical; he feels his way into the subject most carefully, so that when the reader is through with a given chapter he derives a sense of values and acquires that healthy scepticism which is the only true attitude in which to approach the study of medicine. There are the large attributes that make this book to us very welcome. We shall say nothing of the clear, lucid and intimate style, the exceptionally well executed illustrations of Mr. Feinberg, nor the well-chosen references.

A Practical Dietary Computer. AMY ELIZABETH POPE. Octavo, pp. 156. G. P. PUTMAN'S SONS, New York and London, 1917.

The food shortage has involved many alterations in the dietaries of persons anxious to conform to the requests of the Government and to the conditions imposed upon them by their pocketbooks. The importance of a knowledge of the composition and caloric values of foods has been recognized by dietitians occasionally by nurses and physicians.

In the desire to prepare a practical book, particularly for the use of nurses, the author has confined herself largely to the compilation of a series of tables with a description of a simple method of establishing the dietetic sufficiency of menus. It is doubtful whether its place will be other than that of a book of reference in connection with didactic lectures and practical work related to the study of foods and dietaries.

A few technical accidents are noted, such as the presentation of an introduction before the preface, a heading Diabetic Cookery where none is discussed, and the lack of a table of contents which can not be atoned for by the index.

As a book of tables, it has a distinct place in the library of the dietitian. With slight expansion and more descriptive text it might be of greater service to the intelligent housewife who is seeking a simple book that will enable her to compute the rations she must provide and prepare.

Principles and Practice of Physical Diagnosis. JOHN C. DA COSTA, JR., M.D., Associate Professor of Medicine, Jefferson Medical College; Assistant Visiting Physician, Jefferson Hospital; Hematologist, German Hospital; Consulting Physician, Northwestern General Hospital; Fellow of the College of Physicians of Philadelphia; Fellow of the American Academy of Medicine, etc. *Third Edition*; thoroughly revised; 589 pages; 243 original illustrations. W. B. SAUNDERS COMPANY. \$3.50.

Da Costa states that the aim of this book is to present concisely the principles of physical diagnosis and to apply them to the study of thoracic and abdominal diseases. The book has seven sections. The first section

discusses methods and the technic of physical examination. Here are included paracentesis, fluoroscopy and the X-Ray, the tuberculin reaction, pulse tracing procedures, electrocardiography, etc. Section two deals with the examination of the thorax, and section three with the entire bronchopulmonary system. In section four, the various respiratory and mediastinal diseases are considered and their diagnostic points of interest emphasized. Section five and six take up, respectively, the physical diagnosis of the normal and the diseased cardiovascular system. The closing section, seven, presents the physical signs and means of examination of the abdomen and abdominal viscera.

The book is well written, the illustrations are numerous and of direct interest to the subject discussed.

Infant Feeding. CLIFFORD G. GRULEE, A.M., M.D., Assistant Professor of Pediatrics at Rush Medical College; Attending Pediatrician to Presbyterial Hospital, and to the Home for Destitute Crippled Children, Chicago. Illustrated, 326 pages. *Third Edition*; thoroughly revised. W. B. SAUNDERS COMPANY. \$3.25.

Based upon a course of lectures to students there is displayed, a well planned purpose in the conception and writing of this book. Grulee wishes to show that infant feeding is not an empirical subject but that it is supported by scientific principles and processes.

The volume is divided into four parts. Part one deals with the fundamental principles of the infant's nutrition. Beginning with the epoch-making work of Czerny and Keller, it was established that gastrointestinal disturbances in infants could be studied upon a truly scientific basis. To this end much was observed in the child as different from the adult in the domains of metabolism, absorption, physiology, anatomy, and bacteriology. These differences are closely presented in the first portion of the book.

In part two the author considers the nourishment of the infant on the breast. Here are discussed the essential differences between breast and cow's milk, the technic of breast feeding and the disturbances which may arise in the breast-fed baby.

Part three is concerned with artificial feeding—for the normal child and for the child whose nutrition is unbalanced. The classification of nutrition disturbances follows the Finkelstein classification quite closely, *i. e.*, weight disturbance, dyspepsia, decomposition, and intoxication.

In part four the author applies his knowledge of nutrition to many conditions which occur in an infant. Thus, in the premature baby, in the diatheses, in rickets, scurvy, pyloric stenosis, etc., the chief interest lies in the nutritional problems brought up.

There is a consistent effort to consider the nutrition of the child, in health and in ill-health as a distinct problem. Grulee shows that this problem must be attacked with scientific knowledge and in a scientific way.

Talks on Obstetrics. By R. THORNTON LA VAKE, M.D. Instructor in Obstetrics and Gynecology, University of Minnesota, Obstetrician-in-Charge, of the Out-Patient Obstetric Department of the University of Minnesota; Associate Attending Obstetrician and Gynecologist to the Minneapolis City Hospital, etc., etc. St. Louis: C. V. Mosby Company, 1917. Octavo, 151 pp. of text.

These talks are by no means comprehensive; they do not include a great many of the phases of obstetrics dealt with in text books. As the author sets forth, they are intended to supplement for the undergraduates and practitioners' use the numerous text books that are already available. The author need not apologize for this little book. It is written in such entertaining style, it deals with the border lines of obstetrics, often so perplexing to the practitioner, in such a way as to stimulate him to clearer thinking and handling of the problems, that we heartily welcome this contribution to obstetric literature. Besides, the author's original, personal views on the more mooted chapters, as toxæmias of pregnancy and sepsis are in line with the most recent developments in obstetrics and reflect the experience of our Standard teachers.

Diseases of Women. HARRY STURGEON CROSSEN, M.D., F. A. C. S., Associate in Gynecology, Washington University Medical School, and Associate Gynecologist to the Barnes Hospital; Gynecologist to St. Luke's Hospital, Missouri Baptist Sanitarium and St. Louis Mullany Hospital; Fellow of the American Gynecological Society, etc., etc. *Fourth Edition*, revised and enlarged, with eight hundred engravings. St. Louis, C. V. Mosby Company, 1917.

The fourth edition of Crossen's book has been further enlarged by chapters on the ductless glands in relation to gynecology and by numerous drawings and photomicrographs illustrating gynecologic pathology. The chapter on the endocrine system was contributed by Dr. Hugo Ehrenfest to whom fell the task of revision of the book owing to the author's call to war duty. The additional subject matter and illustrations are quite in keeping with the excellent standards established by the previous editions of this very modern, fairly encyclopedic work on the Diagnosis and Treatment of Diseases of Women.

Elements of Hygiene and Public Health (A Textbook for Students and Practitioners of Medicine). By CHARLES PORTER, M.D., B.Sc., M.R.C.P. (Edin.), of the Middle Temple, Barrister-at-Law, Medical Officer of Health, Metropolitan Borough of St. Marylebone. Octavo, pages 378-48. OXFORD UNIVERSITY PRESS, 1917, London. Price, \$4.15.

The importance of public health is accentuated by the attention given to hygiene in military affairs. Medical institutions in the past have failed to give adequate attention to preventive medicine. As a natural result, concise and clearly written text books upon the subject are by no means numerous. In an effort to provide a text book helpful to students, but possessing reference value for a medical practitioner, the author has compiled a volume which suffices to yield the main elements of information which may be of service to professional men.

The author makes no claims for originality, though its plan of organization differs from that adopted by other authors discussing the same subject. From the standpoint of American medical students, the book possesses a doubtful sphere of usefulness because most of the references to specific legislation and documents are of English origin, and many of them possess no analogs in this country.

The distribution of space to the various topics is well considered, and as a result there is a fairly even discussion of public health themes in proportion to their social importance. A number of statements occur which are at variance with American theory and practice, but these are hardly to be regarded as impairing the general usefulness of the volume, inasmuch as it was written from the English point of view, and in general for English students.

A Manual of the Diseases of Infants and Children. JOHN RUHRÄH, M.D., Professor of Diseases of Children in the College of Physicians and Surgeons, Baltimore. Illustrated, 552 pages. *Fourth Edition*; Thoroughly Revised. W. B. SAUNDERS COMPANY. \$2.50.

This book is a small, compact manual, intended, primarily, for the busy medical student. The diseases are discussed according to the anatomical system involved, *viz.*: affections of the mouth and pharynx, of the stomach, intestines, etc.; of the respiratory tract; of the cardiovascular system, etc. The section on infant feeding is especially well written. It contains brief and valuable directions on the four methods of feeding infants: (1) Breast feeding, (2) Wet-nursing, (3) Mixed feeding, (4) Artificial feeding. Not too much time or emphasis is placed upon the percentage method of feeding. The acute exanthemata are described within another condensed portion of this book; the essentials only are presented.

The volume has also a chapter on the Medical Inspection of School Children, and a useful presentation of the Binet tests for the measuring of the development of the intelligence of children.

Progress in Surgery

A Resumé of Recent Literature.

Surgical Experiences in the Present War: I. Gunshot Wounds and their Treatment. II. Injuries to the Peripheral Nerves and their Treatment. III. Gunshot Wounds of the Lungs and Pleura. SIR BERKELEY BATESLEY, *Surgery, Gynecology and Obstetrics, London.*

Perfect mechanical cleansing—that is, the excision of all contaminated, infected, or dead parts—the removal of all fragments of clothing (by far the most important of all causes of continuing infection in a wound) and of all projectiles, is the supreme necessity in all cases. In early cases this may allow of immediate closure of the wound, which will be followed by healing in the majority of cases, say in 80 per cent. or perhaps even 90 per cent. of those in which there is no loss of tissue.

In infected early cases the mechanical exposure and cleansing may be followed by a treatment directed to the removal of the remaining infection. Physiological and antiseptic methods have each their advocates. The aim of both is to permit of the earliest prudent secondary closure of the wound. In infected late cases, a thorough mechanical exposure and cleansing of the wound and the parts around will allow of secondary closure forthwith if certain antiseptic pastes are used. Experience shows that similar results have followed upon this mechanical treatment of the wound without the introduction of antiseptics. A further trial in this class of cases may show that the natural defenses of the tissues are ample to deal with the infections then remaining.

It is the natural defensive powers of the body fluids and tissues, of serum and leucocytes, that are the chief agents in finally subduing the bacterial infection in a wound. Sufficient reliance does not appear to be placed upon the stupendous power the body tissues possess for controlling infection.

Finally full emphasis must be laid on the paramount necessity for the complete immobility of wounded parts at all times and on all occasions. So will one of the most powerful agencies making for re-infection and auto-inoculation be kept in check.

II. Injuries to the Peripheral Nerves and their Treatment.

1. The earliest examination should be made of all wounds in which division of a nerve trunk is probable. If at the casualty clearing station such a lesion is found, end-to-end suture should be adopted forthwith. This is more likely to be possible in cases where primary suture of the wound, after excision, is found practicable.

2. If secondary suture of the wounds, after the Carrel-Dakin method has been practiced, is to be undertaken the union of divided nerves should be secured at the same time.

3. If these methods have been attempted and have failed, they do not prejudice the later union of the nerve. On the contrary they probably insure that an easier and more satisfactory operation can then be practiced.

4. Throughout the whole period before late nerve suture is attempted, the strictest attention must be paid to the relaxation and nutrition of all paralyzed muscles, to the maintenance of suppleness in all joints moved by these muscles, and to the preservation of the integrity of the skin.

5. Operations upon nerve trunks demand the most scrupulous observance of the ritual of asepsis. There must be the great gentleness of manipulation, the nerve must not be injured by instruments or by the surgeon's finger; it must not be separated from its sheath or disturbed overmuch from its bed; it must not be chilled or allowed to dry. All sutures must be of fine catgut and introduced with most punctilious accuracy. Axial rotation of the nerve must be avoided. The cut ends of the nerve before approximation must show clearly the fibers of which the trunk consists.

6. Nerve grafting is of little or no value; nerve anastomosis is to be sharply condemned; the turning down of

flaps from the nerve to bridge a wide gap is useless.

7. Lendon transplantation is of great value in cases where nerve suture is impossible or where suture has given a result not entirely satisfactory.

III. Gunshot Wounds of the Lungs and Pleura.

The approximate mortality from gunshot wounds of the chest at all parts of the line of communication is 20 per cent.

The causes of death are hemorrhage, as a rule, within 28 hours; and sepsis after the third or fourth day.

The local conditions in wounds of the chest wall and lung are in all respects similar to those met with in wounds elsewhere. The missiles are the same, their destructive effects upon the tissues are the same, and the infecting organisms are the same.

The lung tissue is more resistant to attack than many other tissues. The opening of the pleural cavity and the resulting exposure of a large serous sac to infection and all its consequences add, however, a danger of the most threatening character. The chief essential in the treatment of all cases of penetrating wounds of the chest is rest.

In clasp perforating wounds of the chest, rest together with the cleansing and dressing of the wound of entrance or exit, will lead to the recovery of the great majority of cases.

In cases of "open throat," the earliest and most complete effort possible must be made to secure closure of the wound after an appropriate toilet.

In those rare cases of grave hemorrhage, when hemoptysis is present or when the blood escapes by the wound, a direct access to the source of the bleeding must be obtained, when all contingent circumstances permit, and the wound in the lung must be treated by suture, preferably; or by plugging of the cavity from which the blood escapes.

In cases of hemothorax when the blood effused is small in quantity and remains sterile, no active measures are necessary, unless absorption is long delayed. Aspiration, repeated if necessary, may there be performed.

In cases of hemothorax, when the blood effused is large in amount and remains sterile, aspiration after the seventh or eighth day, or earlier in cases of urgent dyspnea, certainly hastens convalescence, permits a more rapid expansion of the lung, and prevents the formation of firm adhesions which may permanently cripple the free movements of the lung.

In cases of hemothorax, whether the amount of blood is small or large, when infection takes place, open operation is necessary, early operation both when the Carrel-Dakin technique or Morison method are adopted saves many weeks of convalescence and permits of a more perfect functional recovery.

Small foreign bodies, or rifle bullets, imbedded in the lung, often cause no symptoms; they become encapsulated and may safely be left.

Larger foreign bodies retrained in the lung may cause distressing or disabling symptoms for long periods. In such cases removal after resection or elevation of the fourth rib through an anterior incision will allow of the safe removal of the projectile from any part of the lung. Pieces of metal so removed are almost always infected.

The Treatment of War Wounds. MAJOR FREDERICK A. BATESLEY, *Surgery, Gynecology and Obstetrics, January, 1918.*

Free excision of the injured tissues, including skin, fat, muscle and bone, when these are obviously devitalized, will in a great many cases permit of early suture with healing by first intention. Next to early excision wide drainage is of greatest importance. In establishing this little respect must be paid to anatomical surface markings. Skin, subcutaneous tissue and deep fascia must be incised longitudinally or horizontally, in a manner which will prevent pocketing. Muscles must be separated and cut completely across if necessary to secure a wide-open wound. Gauze packings are to be avoided and the same applies to irrigating solutions. Hot packs and hot baths to promote better nutrition of the parts through active congestion. This is done during the first twenty-four hours. After this the wound is exposed to the open air with no dressing whatever in contact with its surface for

at least twenty hours out of the twenty-four. Screens protect the wounds against flies. The Carrel Dakin solution is used when it is desirable to close by secondary suture large infected wounds. Convalescence is materially shortened by this method.

Post-operative Pulmonary Complications. ELLIOTT C. CUTLER and JOHN J. MORTON. *Surgery, Gynecology and Obstetrics*, December, 1917.

Amongst the predisposing factors that operate to encourage pulmonary complications following operations, the anesthesia has always held first rank. This has not been the case in the investigations of Cutler and Morton who studied the material of the Massachusetts General Hospital. If administered by a competent anesthetist, the anesthesia as such can be disregarded as a cause of post-operative pulmonary complications. Rather such general systemic weaknesses as anemia, alcoholism, arteriosclerosis, weak heart or susceptible lungs; oral infection, preexisting lung pathology, the presence of septic foci previous to the operation are prone to give rise to pulmonary complications. A bad anesthetic administration, which must be forced, with the aspiration of mucus, vomitus, etc., predisposes to lung complications.

Operations unnecessarily prolonged, especially those in the epigastrium, which open up direct channels of infection in the neighborhood of the lungs, or when there has been too much exposure to cooling fluids or to draughts (vasomotor disturbance), and post-operative pain resulting in hypostasis from poor expansion are other predisposing factors.

As prophylactic measures, the authors recommend the following:

1. Careful preparation of the mouth, eradication of oral sepsis from teeth and tonsils.
2. Preliminary observation of patient for at least two days to exclude lung pathology and septic foci.
3. Careful administration of anesthesia, preferably in the hands of an expert; either by the drop method. Avoidance of mechanical appliances in mouth and nose unless indicated. Surgeon to be ready to operate when patient is prepared.

4. Avoidance of unnecessary exposure to cold or wet on the operating table. Precautions to keep the patient warm with blankets, etc., after the operation and in transferring him to his bed. The temperature of the operating room to be kept above 75° F.

5. Avoidance of trauma, especially in the epigastrium and in the neighborhood of large vessels.

6. Asepsis. In final conclusion the authors recommend the use of silk sutures for the fascia in closing wounds of the epigastrium so as to avoid the use of firm supporting bandages which would splint the lower portion of the lung. Also early getting out of bed and free movement in bed as early as is compatible with the existing conditions in each case.

A Study of Postoperative Pneumonitis. BY ALLEN A. WHIPPLE. *Surgery, Gynecology and Obstetrics*, January, 1918.

Whipple has studied 97 cases of pneumonitis occurring in 1915 and 1916 on the surgical service of the Presbyterian Hospital out of 3,719 patients operated upon. His conclusion is that it is a far more frequent complication than is acknowledged or reported. As a rule these pneumonias are overlooked or mistaken as "postoperative reaction." The X-ray is a valuable aid in the early diagnosis of postoperative pneumonitis giving evidence of consolidation long before physical signs appear. The most important predisposing factors are: recent or concurrent inflammation of some part of the upper respiratory tract; pulmonary congestion; postoperative abdominal pain which inhibits the respiratory excursion; sepsis and cachexia; winter and early spring with increased general virulence of the pneumococcus; the Group IV pneumococcus which is a habitual resident of the throat and is most frequently found in sputum incites an atypical, less virulent type of pneumonitis while Groups I, II and III pneumococcus and streptococcus, etc., cause a more severe type of pneumonitis with a high mortality.

Prevention of exposure of any kind before, during and after the operation is the best prophylaxis. Digitalis pre-operative is not of as much service as counter irritation applied to the chest as by mustard paste, camphorated oil and turpentine.

In the treatment of pneumonitis the mild type requires practically no treatment, resolving by lysis; at most steam inhalations and codeine. While for the severer types where there is cyanosis, dyspnoea and toxemia fresh air is the more preferable, supportive treatment and the early use of colon irrigations to prevent distention. This also supplies water through the intestine without embarrassing the heart action.

The Operative Indications in Hour-Glass Stomach. With a Report of Seventeen Cases. WILLIAM A. DOWNES. *Surgery, Gynecology and Obstetrics*, January, 1918.

Downes basis his observations upon the operative results of seventeen personal cases of hour-glass constriction of the stomach following benign ulcer. Of these cases, sixteen were in females and one in a male. There were four operative procedures employed, all of which were equally satisfactory. These were gastro-enterostomy, gastro-plasty, gastro-gastrostomy, and medio-gastric resection, or resection in continuity. Pylorectomy was added to either of these if the constriction is near the pylorus. The symptoms that compel the patients to submit to the operation are inability to retain food in the stomach, progressive weakness and emaciation. Pain, according to Downes, is a symptom the patients learned to tolerate for a long time. Of the operative methods employed, gastro-enterostomy is the most generally employed, while medio-gastric resection is the ideal method. For the latter, however, the pouches must be fairly large and there must be few adhesions.

Stenosis of Gastro-Enterostomy Stoma, Simulating Recurrence of Carcinoma of the Stomach. RICHARD LEWISOHN. *Surgery, Gynecology and Obstetrics*, November, 1917.

Lewisohn reports two cases in which there were the classical symptoms of recurrence of cancer of the stomach, and yet these symptoms were simulated by mechanical causes not due to recurrence or metastasis of the original tumor. In each of these cases several months after operation with the return of gastric symptoms an x-ray examination revealed stenosis of the previous gastro-enterostomy stoma which was then easily relieved by a secondary operation.

Duodenal Diverticula, with Report of a Case Associated with a Duodenal Ulcer. HARRY P. RITCHIE and GOLDSER L. McWHORTER. *Surgery, Gynecology and Obstetrics*, November, 1917.

A diverticulum, 5 centimetres long and 3.5 centimetres wide, arising from the lower side of the duodenum just below the pylorus, was demonstrated at operation by Ritchie. The patient, now 32 years of age, had suffered with epigastric distress since she was eight years old. Colicky pains of increasing severity for the past two years and with intervals of freedom for not longer than two or three days were the indications for a laparotomy. A chronic ulcer was found associated with the diverticulum and situated on the anterior surface of the duodenum near the superior margin. Plication of the wall of the diverticulum invaginated it and a typical short loop posterior gastro-enterostomy was done. Symptomatically the patient has been free from pain and distress for three months subsequent to the operation.

Some Causes of Occasional Failure in the Operative Treatment of Chronic Gastric and Duodenal Ulcers. GEORGE WOOLSEY. *Surgery, Gynecology and Obstetrics*, November, 1915.

The principal causes of the occasional failure of operative treatment to cure permanently gastric or duodenal ulcer are, in the experience of Woolsey, improper technic

tion of cases, and improper after-care

or cause of postoperative failure, while the source of the sources of infection forms is remediable so that the future results of the operative treatment of chronic gastric and duodenal ulcers should be nearer perfect than they have

Myocardial disease and valvular defects associated with decompensation seriously jeopardize the life of the pregnant woman. Sterilization is proper under such conditions. Pyosalpinx, insanity and epilepsy are relative indications for sterilization. Special environmental conditions determine the advisability of this procedure in each of these instances.

The Fate of the Cystic Duct After Cholecystostomy, an Experimental Study. An Experimental Study. H. C. BROWN. *American Journal of Surgery, Gynecology and Obstetrics*, January, 1918.

The authors report a case in which two years after cholecystostomy, they found upon secondary operation that the cystic duct was dilated to the size of an almond and also contained a small stone which was evidently responsible for persistent attacks of colic. Upon this clinical observation they based their experiments to show that the cystic duct can be and actually is dilated after removal of the gall bladder unless the latter is severed close to the common duct. The experiments confirm those of Clairmont and Haberer and of Oddi who preceded them in demonstrating that the dilated residual cystic duct can perform the functions of a small gall bladder.

Recurrences After "Five Year Period" in Carcinoma of the Cervix. X. O. WERDER. *American Journal of Obstetrics*, November, 1917.

Late metastasis following operation for carcinoma of the cervix is by no means rare. In Werder's experience of 87 cases of cancer of the cervix there were 8 recurrences from five to nine years following the operation. As compared to Wertheim's results, Werder's had a more favorable primary mortality, i. e., 5.7 per cent., as against 16.6 per cent., with total cures of 45.76 per cent., as against 42.5 per cent. in Wertheim's series. But while Wertheim saw late recurrences in only 7 per cent., Werder had 29 per cent. of recurrences after the five year period.

The operation as conducted by Werder consists briefly in a rather high cervix amputation with the cautery knife at a dull red heat, which leaves a perfectly dry, charred wound surface in the vagina. Then with the abdomen opened, the infundibulo-pelvic and round ligaments are tied off. Following this the lower uterine attachments, including broad and sacro-uterine ligaments, are then grasped and thoroughly cooked between the blades of an electro-thermic clamp devised by Downes. No ligatures are needed after the removal of these clamps, as hemostasis is complete, and the tissues thus treated remain absolutely dry.

Werder explains the greater number of late recurrences in his hands on the ground that the cases operated by him as well as by other American surgeons are of a more advanced stage than those of Wertheim's, and the remote lymph nodes are more apt to be affected and though latent for five years may light up at a later date. Cases in which recurrence is seen nine years or more after the primary operation are probably independent growths and not based on the original focus.

Physical Conditions in Women Warranting Sterilization. ELLIS W. HEDGES. *American Journal of Obstetrics*, November, 1917.

If a mother has had eclampsia in two successive confinements she should have her tubes resected so that further conception cannot occur. Diabetes is another indication, providing it is a true diabetes and not the transient glycosuria frequently observed during pregnancy. Chronic nephritis is sufficiently serious for the pregnant patient and warrants tube sterilization.

A well-established pulmonary tuberculosis is a contraindication to pregnancy. Where children are strongly desired and there is a possibility of an arrest of the disease a temporary sterilization may be done by concealing the ends of the tubes in the broad ligament, so that at the desired time, patency may be reestablished. Abortion and concomitant sterilization are recommended for early preg-

Fundal Hysterectomy to Reduce the Menstruating Surface. GORDON K. DICKINSON. *American Journal of Obstetrics*, November, 1917.

Dickinson has found that by removing a wedge-shaped piece of the uterus, thus reducing the endometrium by one-half, the menstrual surface is correspondingly reduced and the patient retains her menstrual function. Bleeding is very much less but genital function is unimpaired as the ovarian circulation is not disturbed. It is preferable to the vaginal supravaginal hysterectomy done for the same indications. The technic is simple and the vaginal route is employed.

Acute Dilatation of the Uterus. N. STONE SCOTT. *American Journal of Obstetrics*, November, 1917.

Scott has had six cases in which he observed an acute dilatation of the uterus without perforation or hemorrhage during the performance of the curettage for abortion. Sudden relaxation of the uterus from a depth of 9 cm. to 15 cm. has been observed. The condition is more frequent than the literature would indicate, according to Scott. It is important to bear this possibility in mind, as the surgeon may otherwise be prone to institute the wrong course of procedure or leave unfinished the necessary operation.

The Management of Decubitus, a System in Use at Kings County Hospital. WILLIAM BROWNING, Brooklyn. *Medical Record*, October 13, 1917.

For the local treatment of bedsores, Browning recommends 1/2% solution of the 40% formaldehyde. A convenient way to meet the various indications each time is to cleanse the ulcer and all its ramifications with plain boiled water as warm as can be handled. Then finish with cold formaldehyde dilution, getting it well into each crypt and sinus. This includes automatically the stimulating effect of alternating temperatures.

To avoid the excruciating action of the solution on the user's hands it might be applied by means of swabs or under the protection of rubber gloves, but it is better to make the application with a syringe. This method has the advantage of facilitating introduction into all pockets and covered tracts and contact with the exposed surfaces.

Finally it is necessary to have a dressing material that in the intervals of cleansing keeps up the action so far as practicable. For this purpose the subiodide (oxyiodide) of bismuth has been found very satisfactory. It is dusted on in sufficient quantity to make a protective absorbent and antiseptic layer everywhere over the area.

This whole dressing must be repeated as often as requisite for cleanliness, at the start several times in 24 hours and thereafter twice or thrice a day is a minimum. When the raw surface becomes dry and clean crusts form, they may be left undisturbed to facilitate cicatrization.

Limitations of Local Anesthesia. LEIGH F. WATSON. *Interstate Medical Journal*, December, 1917.

For fingers and toes infiltration around the base of the digit is sufficient for analgesia. For operations above the wrist and ankle the regional nerve block method of Matas is more satisfactory and quicker than local infiltration.

Trephining, exploratory craniectomy, mastoidectomy and removal of depressed fractures are easily performed under local anesthesia, to the greater safety of the patient. The bone, dura, and brain substance are insensitive.

All forms of inguinal, femoral, ventral and umbilical hernia can be operated under local anesthesia.

Other operations are also mentioned, but those quoted above are most important.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

MARCH, 1918.

No. 3

SOME CONSIDERATIONS OF THE EMBRY- OLOGY, ANATOMY AND PATHOLOGY OF THE PROSTATE.*

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Nicola Massa, a Venetian physician who died in 1563, was probably the first practitioner to call attention to the hypertrophied prostate. There have been many methods of treating this condition— injection of iodine and ergotine into the substance of the gland, tunnelling through the gland, supra-

the urethra. In rare instances the urethra has been found in the adult to merely groove the anterior surface of the prostate and not to be completely encircled by it. In about 1805 John Hunter and Sir Everard Home described the third lobe. This entity, however, does not seem to be sustained by embryological facts. There is a bursa of peritoneal sac shut off between the prostate anteriorly and the rectum posteriorly known as the fascia or

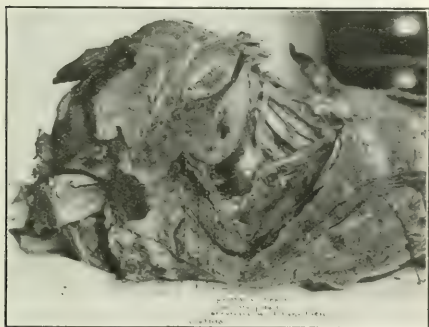


Fig. 1.—Dissection designed to show the prostatic sheath and aponeurosis of Denonvilliers.

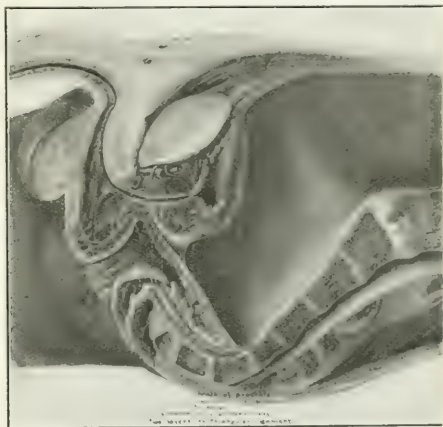


Fig. 2.—A sagittal section of the male pelvis showing the relations of the prostate and the fascia of Denonvilliers.

pubic and perineal puncture, the use of the galvanocaustic incision, and finally prostatectomy.

Of the two routes for prostatectomy, the perineal was first taken up by Harrison in 1881, Ashurst 1882, Annandale 1888, Murphy 1902, Young 1903. The suprapubic method has in recent years become the more popular surgical operation.

Embryology and Anatomy. It should be remembered that the genito-urinary duct is developed from three main sources:

- First, the Wolffian bodies and ducts;
- Second, the Müllerian ducts;
- Third, the allantois.

The prostate gland is first recognized in the third month of fetal life as a thickening in the posterior wall of the urethra. The two lobes remain distinct until the fifth month, when they coalesce around

aponeurosis of Denonvilliers, something like the tunica vaginalis testis, which, although in the adult it is separable into two layers, is lined with serous tissue but no longer discloses a distinct cavity.

The prostate is about the size of a horse chestnut and weighs 15 to 24 grams. It consists of glandular acini and ducts lined with cubical epithelium embedded in involuntary muscles, and well supported by fibrous tissues which constitute the stroma of the organ. Some voluntary muscle fibers are found in the anterior commissure; the involuntary muscle fibers about the urethra are continuous with the circular fibers of the bladder. This stroma is continued peripherally and forms the capsule of the gland, which is separate and distinct from the sheath, which latter is formed by the pelvic fascia. The prostate gland in its development coalesces from behind forward, so that the depth of the

*Read before the Richmond Surgical Society May 1, 1917.

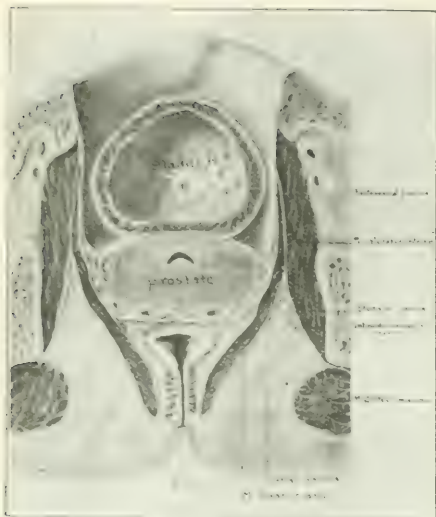


Fig. 4.—Showing the semi-circular folds, its envelopment of the prostatic sinus and the ducts of Santorini.

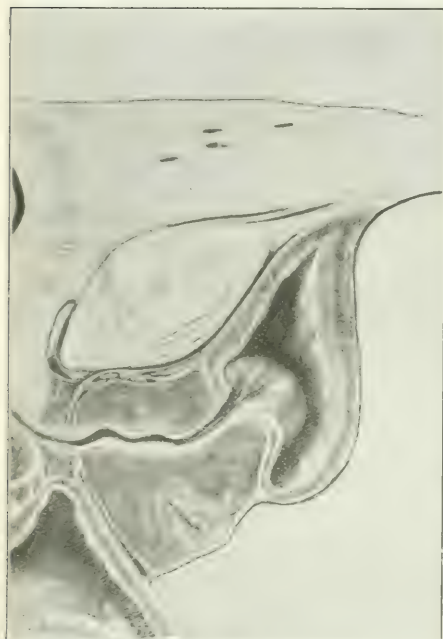


Fig. 5.—Drawing of dissection with prostate removed showing the remaining sheath and plexus of Santorini.

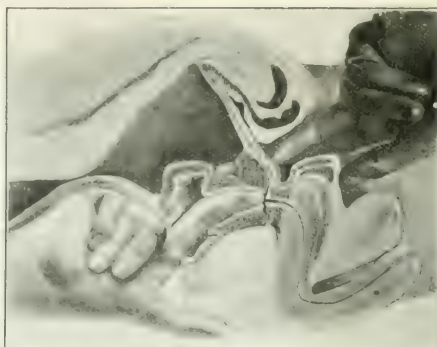


Fig. 6.—The intra-urethral emulsion: finger thrust through the urethra to the posterior layer of the cut-off muscle.

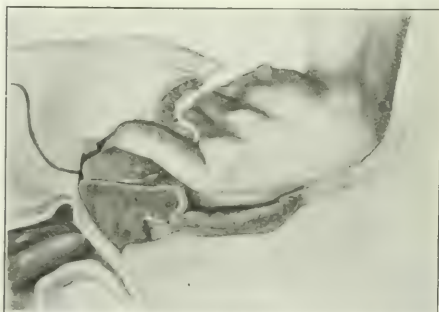


Fig. 7.—The finger seeks the line of cleavage between the sheath and the capsule, and emulsion is carried out from before backwards.



Fig. 8.—The prostatic cavity, showing the acerated plexus of Santorini.

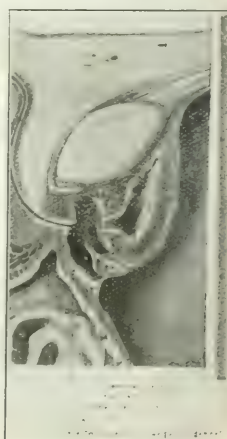


Fig. 9.—Drawing of dissection with prostate removed showing the remaining sheath and plexus of Santorini.

urethra in the substance of the gland is dependent upon the extent of the growth. In the majority of instances about one-third of the organ is in front and two-thirds posteriorly. The pelvic fascia lines the entire side of the levator ani muscle and swings as a hammock from the pubic symphysis anteriorly to the spine of the ischium posteriorly. This forms the sheath of the prostate, between which and the capsule proper is found the plexus of Santorini, which at times is highly developed.

It may be appropriate here to take up the special division of the pelvic fascia, showing its superior,

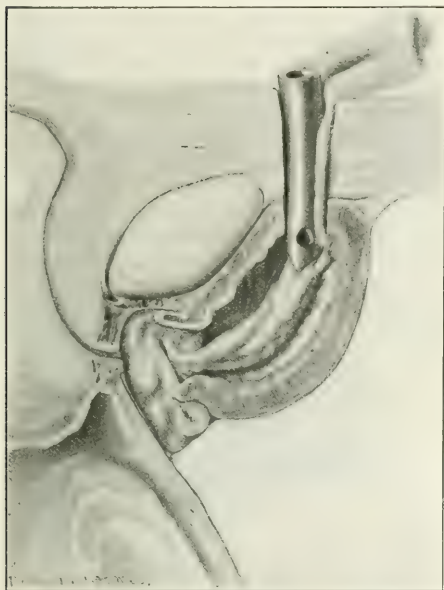


Fig. 9.—Gauze packed into the prostatic bed to prevent hemorrhage, and brought out alongside the suprapubic drain.

middle and inferior layers. Suffice it to say that between the capsule of the prostate and the sheath there are various fibrous prolongations which possibly serve as a medium of support and have been dignified by the name of pubo-prostatic ligaments and the levator prostate, which is superior to the deep layer of the triangular ligament. These facial bands become well organized, particularly in prostatitis and prostatitis, so that in the operation of enucleation much force is required at times, so much so that if the line of cleavage is not definitely determined considerable hemorrhage from the lacerated venous plexus is the result. It must be recalled that the plexus of Santorini lies within the meshes of the sheath of the prostate and entirely

outside of the capsule. These veins travel from before backward along the antero-lateral aspect of the prostate, and, although they have a large number of valves, at times become much engorged and varicose as they run posteriorly to empty into the internal iliac veins, and consequently are subject to phlebolith formation. The uvula vesicae is caused by the reduplication of the involuntary muscle fibers just under the mucous membrane, and these fibres are continuous with the internal sphincter muscular bundles, the connective tissue about the utricle being the homologue of the broad ligament. The normal shape of the prostatic urethra is fusiform. Hyperplasia of the muscular tissue or connective tissue may cause a pathological state simulating prostatic hypertrophy, or contracture of the neck of the bladder.

The prostate must be considered as a compound

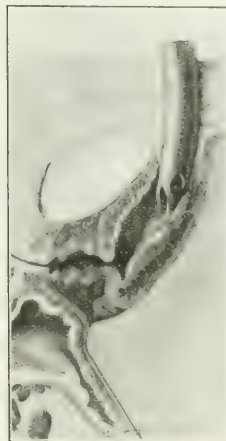


Fig. 10.—The prostatic cavity granulating one week after operation.

tubular gland, and this tissue is most marked in the two lateral lobes of the prostate, and is less in evidence superiorly. The glands and ducts converge towards the urethra. It should be borne in mind that the muscular tissue of the prostate, as brought out by Griffith and Hodson, is a continuation of the circular layer of the bladder, which is longitudinal in direction and ceases at the urethral orifice. Accordingly, the ducts of the prostate are found to be devoid of a special muscular development, whereas the acini have a layer of involuntary muscles lining them throughout their extent.

Pathology. Apparently there are two types of overgrowth of the prostate: first, the soft glandular prostate, and, second, the hard fibrous prostate.

The tumor grows rapidly and the latter slowly. In an adenoma as overgrowth the tumor is characterized by overgrowth of the glandular acini without increase of the number of the corresponding ducts. The compression peripherally by these tumors may be so marked that in time the stroma surrounding this localized glandular overgrowth begins to grow, compressing the acini so that the prostatic tumor formerly almost wholly glandular in character becomes ultimately fibrous and solid. The nodules may be very closely packed together, at

in which there are no palpable evidences of enlarged prostate by rectal examination. Moulin has shown that with prostatic obstruction the floor of the bladder is the part of the reservoir which is the last to be emptied. It is the first to dilate, the effort of the bladder to evacuate itself only serves to press the urine against the floor of the bladder and to increase the capacity of the post-prostatic pouch.

If the lateral lobes enlarge uniformly they tend to spread away from the middle line and raise a fold of tissue as a ridge across the vesical orifice of the urethra. This may be composed of mucous membrane only, or have a varying amount of sub-mucous tissue as well. It receives the name of "bar at the neck of the bladder." It may not be inappropriate just here to refer to that condition called contracture of the neck. Very great impairment of the urinary function may result when there is no apparent obstruction. In such cases the cause of the trouble is the existence of hard or organized edema, or of an arteriosclerosis at the neck of the bladder, or in the substance of the prostate. This condition is the result of a long-standing congestion, rendering the internal orifice firm and rigid, so that me-

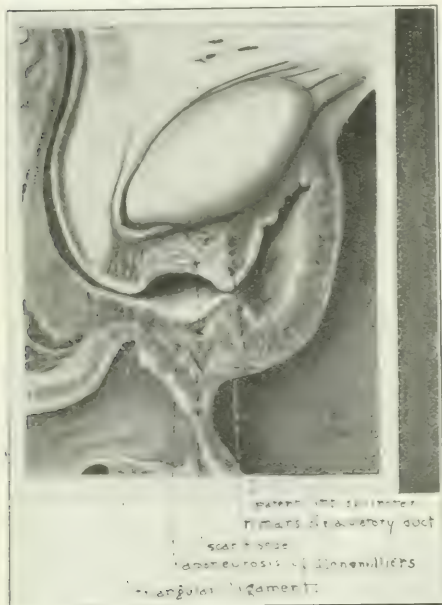


Fig. 11.—Remnant of prostate, removed after gross enlargement, showing scar tissue of the internal ureters.

times inverted from the pressure. The stroma surrounding the ducts and that about the acini show fibroblasts, and here and there may be seen fully formed connective tissues. This further tends to retention cysts, with prospective and possible stone formation. At times a tubule may burst through the capsule and become adherent to the sheath, with the probability of future hypertrophy after an apparently complete prostatectomy; this accounts for the recurrences after the supra-pubic operation.

What formerly was considered as muscular tissue is now known as fibroblasts. It is with such a condition of affairs that Albarran's group of subcervical glands, the accessory prostatic glands, may become involved, more or less blocking the urethra,

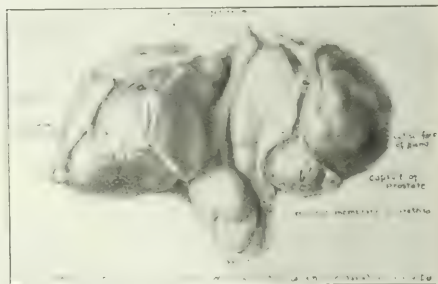


Fig. 12.—Hypertrophied prostate after removal.

chanical obstruction arises from an actual immobility and inelasticity of the parts. It is these instances, in which the prostate is not at all, or but slightly, enlarged, that furnish in the earlier stages an evidence of what is known as the hard or fibrous prostate; later there must be, with compensation, an hypertrophy of the wall. If the obstruction is not relieved replacement fibrosis starts up and the hard "cricket-ball bladder" is the result. The mechanical influence of the pubo-prostatic ligament cannot be disregarded—fixing the roof superiorly, thus inhibiting a sagging and alignment of the vesical outlet, cervical impediment is increased, so that if the conditions of contracture of the neck of the bladder, or elevation of the trigonal ridge,

are present an operation designed to relieve the condition of urinary calls and embarrassment is not benefited by prostatic enucleation. With the condition of retention dilation ensues, the ureteral mouths give way, hydroureter is inaugurated, flattening of the calyces of the kidney is developed, greater strain is put upon the heart, blood pressure is increased, and the vicious circle develops. To this condition of affairs may now be added infection, as the terminal pathological manifestation, with ropy mucus, which further blocks the urethral outlet, the veins turgid and swollen and the imperious calls frequent and distressing.

It has been stated that 25 per cent of all cases of hypertrophy of the prostate are cancerous. Prostatic hypertrophy is really an overgrowth of the acini without corresponding increase in the number of the ducts, with a more or less pronounced peri-acinar round cell infiltration. At times there are two or more layers of cells lining the acini, which simulates strongly cancerous nests. Fortunately cancer starts centrally, the peripheral fascia is dense, and the condition may be borne for a considerable length of time before it escapes into the surrounding structures. Diagnosis in the early stages is important, and early operation affords the only hope of recovery.

A FRENCH LITANY WORTH KNOWING.

A bit of French litany, a little philosophy of the French soldier is before me. It is headed:

"Nothing to Worry About."

"You have two alternatives: Either you are mobilized or you are not. If not, you have nothing to worry about."

"If you are, you have two alternatives: Either you are in camp or at the front. If you are in camp, you have nothing to worry about."

"If you are at the front, you have two alternatives: Either you are in reserve or you are on the fighting line. If you are in reserve, you have nothing to worry about."

"If you are on the fighting line, you have two alternatives: Either you scrap or you don't. If you don't you have nothing to worry about."

"If you do, you have two alternatives: Either you get hurt or you don't. If you don't, you have nothing to worry about."

"If you do, you have two alternatives: Either you get slightly hurt or you get badly hurt. If slightly, you have nothing to worry about."

"If badly, you have two alternatives: Either you recover or you don't. If you recover, you have nothing to worry about. If you don't and have followed my advice clear through, you have done with worry forever."

The name of the author of this philosophy does not appear. Perhaps some French soldier who had acquired the "happy habit" first put it into writing. Nevertheless, it is said that thousands of fighting Frenchmen now know it by heart and have made it their philosophy of army life.—The Silent Partner.—*Medical Insurance and Health Conservation.*

THE ROLE OF LOCAL AND REGIONAL ANESTHESIA IN SURGERY OF THE PROSTATE.*

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NEW YORK.

Our most recent experiences with surgery of the prostate gland lead us to believe that the all important thing is not the anesthetic or the type of operation but is the proper preparation of the patient before any procedure whatever is undertaken. The average person suffering from any disorder of the prostate, particularly on a public hospital service such as Dr. Osgood's and Dr. Keyes' at Bellevue, usually comes to us very late in the course of the disease. The preliminary step is to determine the renal power which the patient has at the time. This investigation is three-fold. First the 24 hour specimen is examined thoroughly to determine whether the full amounts of excretory products are being eliminated. A phenolsulphonophthalein test is then made to determine the functional activity of the renal epithelium. At the same time the blood is examined for non-protein nitrogen contents to decide whether there is retention or not. Thus we have three methods of arriving at a conclusion regarding the functional activity of the kidney.

Unless there is an incompetency of the heart or a disturbance of circulation of grave character, we are inclined to disregard cardiac affections.

The kidney activity is so frequently disturbed that it is almost universal to institute treatment preliminary to operation. This consists of one thing, viz., drainage. It may be accomplished well by means of an indwelling catheter if the patient tolerates it. Otherwise a suprapubic cystostomy may be performed. I prefer the indwelling catheter because it allows the patient to be up and about, which is a decided advantage. Acid sodium phosphate and hexamethylenamin are given as urinary antiseptics.

The choice of operation depends upon the type of obstruction. Changes in the prostate gland or other contiguous structures causing abnormality of greater or less degree at the vesical orifice, occur in sixty-one cases out of two hundred and twenty-four studied. Fourteen and seven-tenths per cent. of the entire number of specimens observed showed an enlargement of the subcervical group of tubules. Most of these occur after the thirtieth year, so that 22.8% of

* Read before the Section on Genito-Urinary Surgery, N. Y. Academy of Medicine, October 17, 1917.

the specimens older than this show such an abnormality. General enlargement of the prostate occurs in 11.1% of all the glands studied. There are three enlargements of the subcervical group. The usual subcervical group enlargement is unilobular. Occasionally the enlargement may be divided into three portions. There are two types of obstruction with intravesical projection at the posterior portion of the neck of the bladder. The most common is an enlargement of the subcervical group with projection from within the sphincter. The second type is an enlargement of the middle lobe proper which develops outside the sphincter and projects into the bladder by lifting the trigonum vesicae.

All of the methods utilized in the surgical treatment of tumors of the subcervical group may be performed under local anesthesia. The usual method is to empty the bladder, then instill one ounce of novocaine 4% into the posterior urethra and inject the anterior urethra as well. Fully twenty minutes should be given this drug in which to act thoroughly. Dr. Barringer has introduced a new method recently, viz., direct injection of the anesthetic into various parts of the prostate by means of a needle projected though the perineum and guided by a finger in the rectum. This method I have found to be very effective.

Numerous procedures have been recommended. I have found Young's punch operation to be decidedly the best method employed in removing these intra-sphincteric masses, be they small, large, unilobular, or trilobular. The instrument is introduced so that the fenestra is in the posterior urethra. The obturator is withdrawn and the instrument inserted still further until the tumor at the vesical orifice rises into the fenestra, completely filling it. The cutting inner tube is then introduced and quickly pushed into position, punching out the entire portion of the tumor in the fenestra. The instrument is then turned obliquely to the right, then to the left, where the procedure is repeated. The instrument is then withdrawn and a catheter with a large fenestra introduced. It is wise to keep a small amount of fluid in the bladder continually, but the former practice of keeping up continuous irrigations has been given up as it seems to delay the clotting of the blood and delays healing. As a rule the bleeding stops after a few hours, and the catheter can often be removed after twenty-four or thirty-six hours.

Bugbee, McCarthy and Stevens have treated

these tumors by burning a groove through them with a high frequency current and in some cases it is to be recommended. Fibrous stricture at the vesical orifice may be treated by the Chetwood galvano-cautery under local or spinal anesthesia. Local anesthesia plays a very important rôle in benign hypertrophy of the prostate. Formerly spinal anesthesia was practiced very frequently, especially by Hugh Cabot of Boston and E. L. Keyes of New York. The technique of its employment is as follows:

The patient is seated upon the operating table with back bent forward, a spinal needle is introduced into the spinal canal and a few cc. of the spinal fluid withdrawn into a Record syringe which already contains 1 cc. of 5% tropococaine, or whatever anesthetic is to be used. This is injected. The patient is then laid upon his back with head elevated for a few minutes and then raised to a semi-reclining position. Within five or ten minutes the patient notices a tingling sensation of the lower extremities and the operation may be begun. Position is extremely important in the use of spinal anesthesia. Unless the patient is placed in a semi-reclining position the anesthesia may travel to the medulla and result fatally. This accounts for the inadvisability of perineal operations under spinal anesthesia.

The utilization of spinal anesthesia in surgery of the prostate has become very limited on account of the fact that the mortality of the procedure became excessive and on account of perfection of other methods.

It is my practice to perform Young's perineal prostatectomy in every case unless it is contraindicated by some particular feature. These contraindications are: (1) Inability of the patient to take gas-and-oxygen anesthesia because this operation cannot under ordinary circumstances be done under local or spinal anesthesia; (2) the presence of a marked enlargement of the subcervical group of tubules; (3) the presence of a stone too large to be removed through the perineum. Our method on the service at Bellevue Hospital in any suprapubic prostatectomy is to infiltrate the skin with 0.2% cocaine. A 3-incⁿ incision is made in the midline commencing just above the symphysis pubis. It is deepened through the subcutaneous fat, superficial, and deep fasciae, and rectus abdominalis, and pyramidalis muscles, under the influence of 0.1% cocaine. Then a lateral incision is made in the prevesical fascia at a low point under the same drug and the fascia and prevesical fat as well

as any reflection of the peritoneum are peeled back exposing the bladder which has previously been distended with fluid. The bladder wall is then infiltrated with cocaine and an incision long enough to admit two fingers is made into the bladder, the edges being caught with two clamps.

Then gas-oxygen anesthesia is instituted for the actual enucleation of the prostate by the intraurethral method usually inserting two fingers in the rectum to aid in the manipulation. At the completion of the enucleation the anesthetic is discontinued and if the bleeding is not marked the bladder is closed with a large Marion tube fixed at the highest point of the incision. If the bleeding is profuse the patient is put into the Trendelenburg position, the bladder retracted and the bleeding points clamped and ligated just as they would be in an operation on any other part of the body. The entire closure is done without the use of gas and oxygen because the local anesthetic previously infiltrated is still effectual in preventing sensation in the tissues to be sutured.

I wish to mention in a preliminary way a modification of the procedure. In a small series of cases that I have recently operated upon I have placed the patient in a lithotomy position. The suprapubic operation is then performed in the manner described. While the patient is yet under the gas-oxygen anesthesia a median perineal incision is made into the membranous urethra and a perineal tube sutured into place. The bladder is then closed up tight above, the entire drainage taking place through the perineal tube, suction being used by means of the vacuum bottle system devised by Caples. I shall give a more extended report upon this method as soon as I have a sufficiently large series.

The reason why we do not attempt the enucleation under local anesthesia is that the gas and oxygen so little disturbs the kidney function that it has not seemed worth while causing the patient the pain which would result from the rather vigorous exercise coincident with the actual removal of the gland.

Complete prostatectomy in early carcinoma by Young's method is not feasible under local or spinal anesthesia.

One of three methods may be followed to relieve retention of carcinoma, the operation of choice to be determined by the nature of the case. If only a portion of the prostate is involved the gland may be removed by the suprapubic method. If the entire prostate is carcino-

matous and instrumentation is not too difficult a Young's punch operation may be performed under local anesthesia. If there is complete retention and instrumentation is painful and difficult a suprapubic cystostomy under local anesthesia is indicated.

THE ROENTGEN RAY EXAMINATION OF FRACTURES.*

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The Roentgen Ray examination of fractures is a method of diagnosis so thoroughly established and so universally employed that any consideration of it would appear to be entirely superfluous, for it would seem as if nothing new or striking could be advanced.

It is, however, important that we pause occasionally to review this subject, to estimate the actual value of its contribution, to establish its limitations, its advantages and disadvantages over the clinical methods; in other words, to determine what has been the actual gain to surgery from the utilization of this method.

The groundless conflict between laboratory and clinical methods has been extended to this form of examination, for there are unfortunately still some who do not cease bemoaning the abandonment of the so-called clinical methods for the newer method, which they describe as being inaccurate, misleading and not essential for the proper diagnosis and therapy. This attitude, however, is as untenable as the stand of those who prate of the uselessness of the clinical methods and urge their abandonment in favor of the simpler, harmless and more accurate Roentgen Ray examination. A little consideration will show that these two methods are not antagonistic but are interdependent and sustain and strengthen each other.

Roentgenology unquestionably has amplified our knowledge by permitting us to classify more accurately and identify the results of trauma. But it must be admitted that the greatest contribution which Roentgenology has made to the study of fractures has been that it has, by correcting the errors and strengthening the weak points of the clinical method, sharpened our clinical sense. It has improved our diagnostic ability and by thus acting as a check and a corrective factor to the clinical examination, the latter has

*Lecture delivered to the Medical Residency Clinicians at Bellevue Hospital, New York City.

be intended more firmly than ever as an indispensable diagnostic method which is always available.

Radiography has given us a mental concept of a fracture, such as former generations did not and could not possess. With the advent of war, the study of traumatic injuries gains in importance. The main characteristics which these fractures possess are multiplicity, comminution, the association of foreign bodies and the complications of inflammation. The methods of Roentgen examination which are used in the study of fractures are as follows:

METHODS OF ROENTGEN EXAMINATION OF FRACTURES

1. Transillumination—roentgenoscopy.

(a) General

2. Photographic method—roentgenography

(a) General examination

Single plate target—plate distance 25-30 inches.

Centric

or

Excentric

(b) Special examination

(1) Stereorontgenography—two plates made with deviation of tube $2\frac{1}{2}$ inches, the relation of plate to part remaining unchanged.

1. Fluoroscopic examination.

Roentgenoscopy, or examination by means of the fluorescent screen, is one of the important methods in the diagnosis of fractures. Because of the simplicity and small cost it has become an essential part of the equipment for diagnostic work.

The plate examination is comparatively far more complicated than the fluoroscopic method and requires numerous accessory appliances and, though it has the advantage of permanency and greater accuracy of its records, nevertheless, the simplicity, convenience and rapidity in obtaining results make the fluoroscope an instrument of greater general utility.

The requisites of safe and successful fluoroscopy are: 1, a ray of proper quantity and quality; 2, a screen of proper quality, size and suspension; 3, the proper sensitization of the eye; 4, the protection from deleterious effects. Careful attention to the first three requisites will contribute in a large measure to the establishment of the fourth.

Generally speaking, the horizontal fluoroscope is of greater utility in the examination of frac-

tures than the vertical. The stative, whether horizontal or vertical, should be of such construction as to permit the maximum mobility of tube, patient, and screen. This means independence of screen movement from tube movement.

The x-ray tube should be completely enclosed in a box lined with lead, the container being more heavily covered over the active hemisphere. The tube box should be equipped with an iris or a slit diaphragm or both, the latter being of greater utility. Means of cooling the tube should be provided; a fan is usually sufficient. The opening of the box should be at least five by five inches and covered by a sheet of aluminum one millimeter thick. The box is to be suspended by counterweights and is to be freely movable in all directions by a single handle which should also contain the handles for the diaphragm and be long enough to bring the hand of the operator moving the tube completely out of range of the most divergent ray. The tube box should hang on a device which makes it part of a lead partition, moving behind another immovable lead partition, containing a large fiber window against which the patient rests. In this way a double lead partition with an intervening air space is provided. The distance of the target of the tube from the patient should not be less than twelve inches.

The horizontal apparatus should be a canvas or fiber topped table, under which the lead-lined box, containing the tube, moves freely in all directions. Means should be provided for keeping the canvas taut. The sides of the table should be covered with leaded rubber curtains.

With the vertical scope the screen is to be suspended independently by counterweights and should be of such weight and suspension as to hang closely and firmly against the patient without pressure. The screen should furnish a maximum illumination with a minimum amount of current, proper contrast, have freedom from lag and permanence of coating, be placed in an air-proof mounting and be covered with lead glass one-sixth of an inch thick. It is an advantage, also, to have an arrangement on the back of the screen whereby the plate holder may be clamped in any position for the purpose of making an exposure during fluoroscopy. Means should be provided for easy and rapid tracing of the fluoroscopic image, as drawn on the lead glass, on tracing paper attached to the screen holder. With the vertical apparatus a fourteen by seventeen-inch screen should be used in all in-

stances, when possible, for even though the entire screen is rarely illuminated during fluoroscopy, it nevertheless offers a certain amount of protection to the operator. From the lower edge of the frame of the screen an apron of lead rubber at least eighteen inches long and as wide as the screen should be suspended. Several cuts in this will permit the use of the palpation spoons. With the horizontal apparatus a smaller (10" x 12") and not too heavy screen is to be preferred. This should be set in a fringe of lead rubber six inches wide. Handles sheathed in lead are attached to the frame for protection of the hand, when manipulating the screen. The old fluoroscopic viewing box consisted of a small screen attached to a pyramidal hood of cardboard, the eyes being applied to the smaller end, so that the examination can be made in a lighted room. This has come into vogue again because of military needs. Such a pyramidal fluoroscopic screen has been described by Dessani. It is to be fitted to the wearer's eyes and kept in position by bands across the head. By a hinged arrangement the fluoroscope may be tilted back out of the line of vision. When so used, the observer looks through a layer of ruby or green glass, which permits operative procedure without desensitizing the eyes.

Too great emphasis cannot be laid on the problem of protection. The Roentgen-Ray is an agent capable of causing considerable damage to the organism. Though this appears to be generally appreciated, it is nevertheless surprising to note the utter disregard of this danger during fluoroscopy, particularly with the use of the Coolidge tube, when many of the limitations which gave a certain margin of safety when the Crookes tube was used, do not exist. Carelessness in providing suitable protective measures is bound, sooner or later, to lead to disastrous results. It must not be forgotten that the late skin effects may, and usually do, come on from four to seven years after prolonged exposure. Immunity from such effects for a year or two instils a false sense of security. Eternal vigilance is the price of an intact skin. Such additional protective devices as lead-rubber gloves are essential and ordinary leather gloves should be worn underneath the rubber gloves. This is particularly important if fluoroscopy be used for the reposition of the fragments. Lead glass goggles and leaded aprons are useful in further increasing the safety of fluoroscopy. The tube, if of the Crookes variety, should be of medium

focus and "air regulated"; if of the Coolidge variety, the "sharp" focus tube. With the Coolidge tube the transformer is a simple and convenient and easily controllable method of energization. With the Crookes tube a coil and mercury or mechanical break give the best service.

The quality of the tube should be of sufficiently high vacuum to permit a clear differentiation between cortex and medulla. What should be sought for is detail with sufficient contrast. Should it be necessary to move in and out of the fluoroscopic room, colored glasses should be worn. Sensitization of the eye is extremely important. The illumination of the fluoroscopic room should always be indirect, dim, and of a bluish green tint, the color of the fluorescence of the screen. Sensitization may also be accomplished by tiring the eye for its complementary color, red.

Previous to the examination, the room, which should be well ventilated, and the air kept in motion, should be darkened. The observer should remain in partial darkness for at least ten minutes and in absolute darkness for five minutes, before the first examination is begun. The visible light from the tube itself must be eliminated. The static glow of the wires carrying the high tension may be eliminated by the use of a tin or iron piping or heavily covered cable.

The foot switch should be placed in a convenient situation and permit the control, not only of the energization of the x-ray tube, but the general lighting of the room.

The examiner should have everything at hand, so that there need be no stumbling or fumbling in the dark or turning on of lights. He need not necessarily stand directly in front of the screen, for the observation may be made just as accurately when standing to one side and thus out of the direct path of the rays. The examination must be thorough but rapid. The energizing of the tube must be intermittent. It is a foolhardy and useless procedure to fluoroscope a patient over a long period of time. A glance and then an interval for orientation and thought, then another period for observations, followed by a period of darkness, for consideration as to what is observed and what is to be sought or still to be determined. By this method the interest of the patient is safeguarded and prolonged exposure is avoided. It should always be borne in mind that there exists an idiosyncrasy on the part of some individuals to the ray.

Working with a gas tube, whose equivalent spark gap value is seven inches, or with a Coolidge tube of six inches, and using two or three milliamperes of current, through one millimeter of aluminum, an exposure of twelve minutes is the limit of safety at the usual target-skin distance, if a skin reaction is to be avoided. With the constant moving of the body of the patient, incidental to the examination in all directions, no part should, therefore, ever receive a large fraction of a dose.

The disadvantages of fluoroscopy are:

1. The overlooking of fissures and fractures where there is no displacement of fragments or fractures of carpus or tarsus.
2. Exaggeration of deformity by distortion of shadows.
3. Damages of exposure.
4. In operative work, the dangers of explosion from the ignition of the anesthetic by electric spark.
2. Radiographic examination.

For the proper interpretation of the data obtained in the x-ray examination of fractures, it is essential that a few technical points be utilized and appreciated.

From the focal point on the target the rays, traveling in straight lines, diverge in all directions. That ray which falls at right angles to the recording surface is the central ray; the rest are divergent. Any structure interposed in their path casts a more or less distorted shadow, depending on the relation between the source of illumination, the object, and the recording surface. There are several roentgenological axioms covering this relationship, which are constantly applied both in technique and interpretation.

1. The nearer the object is to the recording surface, the smaller and sharper its shadow.

Practical application: The part to be studied should be placed as near the plate as possible, thus a sharper shadow of the fibula or the fifth metatarsal is obtained with the plate at the external aspect of the leg than at the internal; of the clavicle in the dorso-ventral view than in the ventro-dorsal.

2. The closer or more nearly an object lies with its long axis parallel to the recording surface, the less the deviation of its shadow by displacement of the source of illumination.

This axiom is utilized in the localization of foreign bodies in the tissues, for, if the shadow of the foreign body is smaller and sharper, when

examined from the anterior aspect, then it is located more anteriorly than posteriorly. In the study of the relationship of fragments of a fracture, when views at right angles cannot be made, the fragment with the large, hazier and more distorted shadow is the further from the recording-surface. When the object lies obliquely to the horizontal plane, the recording surface should be placed parallel to it and the central ray directed at right angles to the recording surface.

Corollary: In a part at a distance from the plate the distortion is minimized by increasing the tube object distance. This also becomes necessary when, because of a plaster cast or bandaging it is impossible to bring the part in close apposition to the plate.

3. The further the tube is from the object, the smaller and sharper will be its shadow.

Practical application: The tube distance should be such as to give a minimum distortion. Eighteen inches target-skin distance has been adopted for general purposes.

Thus for the extremities, the target plate distance varies from twenty to twenty-four inches and for the thorax from twenty-six to thirty inches. When it becomes necessary to estimate the diameters of a structure—the distortion is reduced to a minimum by a long tube-plate distance. This is usually two meters.

Note: The intensity of the illumination diminishes in inverse ratio to the square of the target plate distance.

4. The more nearly perpendicular the object is to the central ray, the smaller and sharper the shadow.

The more the divergence of the ray, the greater the distortion of the shadow of the object transilluminated by it. The distortion due to this divergence of the ray may be minimized by increasing the tube-object distance.

Practical application: If a linear object is seen in its true cross section, it lies directly in the path of the central ray. In the examination of the vertebrae, a true shadow will be cast by the body of that one vertebra which lies at right angles to the central bundle, while the distortion will be progressively greater in the vertebra, the further they are from the one transilluminated by the central ray. Therefore, either the target plate distance must be increased (with proportionate increase in exposure and fogging due to secondary radiation), or with the aid of cylinders and diaphragms but two vertebrae are examined at each exposure.

The advantages of the x -ray examination may be stated as follows:

1. It permits diagnosis of those fractures in which there is no displacement of fragments and in which the classical clinical signs cannot be obtained, as for instance in fractures of the carpal or tarsal bones, the tibial head, fractures of the posterior part of the internal malleolus of the tibia (interosseous), in fissure fracture of the skull, in incomplete fractures of long bones, in periosteal and in sprain fractures.

2. It permits the diagnosis of lesions in bones which are palpated only with difficulty, as the ribs under the scapula, the coracoid process, the pelvis and vertebrae, the radial head, the neck of the femur.

3. It gives such information regarding direction, variety and number of fracture lines, shape and size of fragments, as cannot be obtained by any other examination.

4. It simplifies the differential diagnosis between diaphyseal fractures and epiphyseal separation. This is important because of the disturbance in growth which may follow epiphyseal separation. The frequent occurrence of fractures of the diaphysis is at one-half to three-quarters above the epiphyseal line and makes the differential diagnosis by clinical means impossible. If the separation is slight, the tear in the periosteum of the diaphysis gives the clue. An excellent rule in an injury about the joints in children is to take both sides for comparison with the same technique. This may obviate the necessity of waiting in some cases for the callus formation to disclose the presence of a fracture.

5. It gives information regarding pathological conditions in which the complicating fracture may be the first manifest indication of such disease, as in benign or malignant tumors, fragilitas ossium—Paget's disease.

6. It furnishes a simple, painless method of diagnosis and of control of treatment, giving information, not only as to position of the fragments and the progress of union, but aiding in the decision regarding operative interference for removal of fragments, foreign bodies, etc.

The commonest errors arise from the following causes:

1. When the parts are incapable of immobilization.

2. When the affected parts cannot be placed in close apposition to the plate.

These errors may be avoided by a careful attention to technique. The immobilization of the

part is important because the movement may be blur the bony outline as to make it impossible to definitely determine the fracture line. This is particularly so in the determination of fractures of the skull in children or in fracture of the ribs or in fracture about the shoulder joint.

When immobilization is impossible, rapid exposures must be resorted to. Everything which makes for the comfortable position of the examined limb aids in immobilization. This may be accomplished not only by weights, sand bags, bandages, adhesive plaster, pads and inflated rubber bags, but also by certain positions of the body by which the affected part is put at rest with the muscles relaxed and made to approximate the plate as closely as possible. Any portion of the forearm or arm to be examined properly must be placed at the level of the shoulder. For the examination of the leg it is necessary that the thigh muscles be relaxed. To minimize distortion where approximation of plate to part cannot be obtained, the distance from tube to plate should be increased.

3. When there exist no changes in form and outline of the bone nor any displacement of fragments.

In the examination of fractures there are two considerations:

1. To determine the presence of a fracture.
2. To determine the degree of deformity.

These two conditions cannot always be met with the same examination, since it is frequently necessary purposely to distort the outlines of the bones in order to determine the presence of a fracture. This gives an exaggerated and false picture of the deformity. The latter condition should be judged by a normal exposure. What this term means unfortunately is not generally appreciated. Radiography is now a haphazard procedure. In the production of the radiograph of any part, it is necessary that a definite technique be followed in the arrangement of the relationship of the object to the recording surface and the central ray. Such arrangements have been definitely established and the resulting views of the parts constitute what are called normal exposures.

These views can be obtained only by observing the rules regarding the centering of the central ray over certain bony landmarks, with the parts in certain definite postures. At the joint ends, what is sought is a clear view of the joint, unobscured by the overlapping of bony parts. By the various postures, the bones studied are

ing axis close and the long axis as nearly parallel to the recording surface as possible. Thus in the examination of the shoulder, the arrangement is different, depending upon whether it is the gleno-humeral or the acromio-clavicular joint which is to be studied. Thus the scaphoid is to be placed in its long axis to the recording surface, ulnar deflection of carpus and abduction of the thumb must be practised.

The designations utilized in describing the particular exposures of the part indicate ray direction. Thus dorso-ventral indicates that the recording surface is at the ventrum, the tube at the dorsum. Extero-internal indicates that the recording surface is placed to the interior aspect of the limb, with the tube at the external aspect. The complete examination requires at least two views at right angles to each other. As a rule the sagittal and frontal centric views suffice, but frequently the excentric becomes necessary.

It is always advisable to mark the plate with a lead letter R or L, when either right or left side is examined and the lateral exposures with the letters In and Ex, when the internal or external aspect is in contact with the plate.

4. When the examination cannot be made or is made only with difficulty in more than one direction.

Under these circumstances the relative sharpness of the fragments (bearing in mind the axiom that the nearer to the recording surface an object is, the sharper and truer its shadow) will permit the determination of the relationship of the fragments to each other. Thus, in ventro-dorsal sagittal views, the sharper fragment is the one which is displaced posteriorly. This determination often becomes necessary in fractures about the upper end of the femur or humerus. The stereoscopic examination is here of great assistance.

6. When the fracture is in that axis of the bone that makes the examination in a plane perpendicular to the axis of the bone impossible.

These errors may be avoided also by a stereoscopic examination. It is particularly valuable about the joints, to study the direction and extent of fissures and to seek the important information, which is not always easy to obtain, if the fissure extends into the joint. Frequently, however, fissures parallel to the axis of the bone will escape detection and when clinical evidence is strong, it is advisable to wait two or three weeks and then the callus, at the suspected point, makes the diagnosis clear.

Indirect evidence is often valuable as indicating fractures. With a history of trauma, if the shadow of the fifth lumbar vertebra has a marked obliquity or cannot be outlined at all, a fracture should be suspected. Fractures of the articular processes of the vertebrae may be suspected when the malposition of the bodies exists as shown by a change in the alignment of the spinous processes. If, in a suspected case, both the transverse processes of one vertebrae are narrowed and its axis deviates from that of the vertebrae above and below, one must suspect a fracture of the body of the vertebrae. A fracture of the pelvis may be suspected from the hip plate by a study of the lower end of the sacroiliac synchondrosis. The sacrum, like the keystone of an arch, registers any break in the arch by a slipping and consequent distortion of the sacroiliac joint space, the lower part of which should show a normal hip exposure.

7. When the fractures are multiple and at extreme ends of associated bones, as the upper end of the fibula and the lower end of the tibia.

The error of overlooking one of several fractures may frequently be placed at the door of the clinician whose cursory and unsatisfactory clinical examination confines the x-ray examination to a certain particular part of the limb, when the proper clinical examination would have included a request of the roentgenologist to include all the parts affected. This is particularly true in hospitals and laboratories where a localization of the lesion is requested in order to facilitate the examination. The Roentgenologist, however, has certain findings which warn him that other fractures should be looked for: for instance, a fracture of the tibia low down with marked displacement of fragments usually is associated with a fracture of the fibula high up. The fracture of the lower end of the ulna usually is associated with a fracture of the radius. A fracture of the pubes usually is associated with a fracture of the ilium. A fracture of the os calcis frequently is accompanied by a fracture of the internal malleolus of the tibia or of the metatarsal bones. In injuries about the wrist, scrutinize the lower end of the radius, the styloid process of the ulna, the base of the first metacarpal and carpal scaphoid.

8. When the fracture lines are mistaken for artifacts, soft tissue folds (axillary and anal) calcifications of bursae or tendons, epiphyseal lines, epiphyseal scars, supernumerary bones, the fabella being mistaken for fracture of the femoral epicondyles, the os trigonum for fracture through

the posterior process of the astragalus, os peroneum for cuboid fracture, os vesalianum for fracture of the base of the fifth metatarsal and os triangularis or fracture of the styloid process of the ulna. Sesamoids may be mistaken for fragments of a fracture and pulmonary markings for fractures of the ribs, the line of the psoas or fracture of the transverse processes of the vertebrae.

9. When the examinations are made through heavy casts or heavy board splints. Under these circumstances the exposure should be doubled without a change in the quality of the x-ray. Subperiosteal fractures and callus formation about complete fractures are frequently undeterminable when heavy casts have been applied, particularly so if the casts are wet.

10. By looking and not seeing. This is easily remedied by a slow and careful perusal of the entire bone length and by a refusal to be rushed into the diagnosis of a wet or dirty plate, but to give as much care and studious contemplation of the plate as the surgeon does of the patient.

DEFORMITY.

One of the important lessons which we have, however, been late to learn is that anatomical restitution of the fracture is not essential for perfect functional and perhaps also for cosmetic results, and that, on the contrary, much harm may be done by overzealous effort to place the fragments in direct continuity. The reconstructive power of the callus is not fully appreciated and particularly where the forces of stress are called strongly into play, the results are frequently astonishing when one compares the condition at the time of fracture and after firm bony union with normal absorption has taken place. But inference as to functional results cannot always be correctly drawn from the radiologic study of the position of the fragments.

CALLUS.

The genesis of the callus to its final transformation into bone is not as a rule studied as closely as it should be. Though in children the hazy shadow of a mass enveloping the fracture ends may be seen at the tenth day, before calcification sets in—in adults, it is visible only when the lime salts are deposited at the end of three weeks, while in the aged its shadow may not be seen before six weeks and even then as having but small extent.

The portion of the callus nearest the bone first shows signs of ossification and then from this

point it spreads outward to the periphery, frequently visible even quite a distance above the point of fracture, under the torn periosteum. A bordering line of increased density then becomes visible in the periphery of the callus shadow, marking its outer boundary.

Between its inner boundary and the shaft of the bone a clear space, corresponding to the osteogenetic layer, is visible. The ossification of the callus may be considered at an end when this line disappears and the callus shadow shows no line of demarcation between it and the cortex. If manipulation at this time still shows movement between the fragments, non-union may be diagnosed and means can be taken to stimulate or produce a new callus formation. At first the ossified callus is irregular in its form and show no evidence of bone striae, but under the stress of weights and muscular action there is absorption and the configuration to the normal bone outline. The bone markings characteristic of the bone involved become visible, the sharp points and irregularities of the callus become rounded off. Fragments which do not unite by bone to shaft take on the appearance of sesamoids and show the so-called pseudo-arthritis changes, characterized by an atrophy of their bony structure with sharp bordering of the cortex and the presence of small bony excrescences springing from the periosteum.

SCHEME OF ANALYSIS AND REPORT.			
Plate No.	Bone.	E. L.	Part.
Variety.	Simple Spiral Multiple Comminuted Epiphyseal	Direct	Oblique longit. trans. Spiral T shaped X shaped Stellate Irreg.
Time of Fracture	Complete Incomplete Greenstick Fissure		
Displ. frag. (degree)	(0, 1, 2, 3)		
Upper frag. (direction)			Overlapping
Lower frag. (direction)			
Callus	Complication		Tumor Inflammation Foreign body Systemic diseases
Associated fractures			
Pathological findings			
Diagnosis.			
11 E. 68th St.			

HOSPITAL WASTE.

One of the most certain ways of reducing the waste in hospitals is to lessen the number of those needing hospital attention. The salvage of supplies, of time, of labor, of energy, may be partially brought about through an intelligent attempt to secure the salvage of health.—*American Medicine.*

THE VARIETIES OF STRICTURE OF THE RECTUM.

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The rectum is probably the most frequent site, as compared with any other bodily outlet, for stricture. The symptoms and diagnosis of rectal or anal stricture are dependent, in the majority of cases, upon the causation and the degree of obstruction of the bowel. Patients often imagine they have stricture when the sphincters are in constant spasm as the result of a fissure or other painful affection at the anal orifice. Many cases have been treated for stricture when examination with the sigmoidoscope has revealed hypertrophied Houston valves. A stricture may be complicated by the presence of a fistula burrowing from an ulcerated surface in any direction.

A classification of rectal strictures, according to the various causes, may be accepted as follows:

- (1) Malignant disease.
- (2) Congenital defects.
- (3) Traumatism (operations).
- (4) Venereal disease.
- (5) Catarrhal inflammations.
- (6) Tuberculosis.
- (7) Ulcerations.
- (8) Spasm of sphincters.
- (9) Hypertrophy of Houston's valves.
- (10) Pressure from adjacent organs, or tumors.
- (11) Acute inflammations.

Concisely stated, the chief symptoms of rectal stricture are constipation, obstipation and fecal impaction with or without blood or mucus in the stools.

The cause and duration of strictures provide a relative form, as the *annular*, a ring-like encircling of the rectum; the *tubular* form, encircling the bowel for several inches, or the *complete* stricture which occludes the entire bowel.

The most frequent sites are at the point where the levator ani muscle encircles the rectum and within three and a half inches from the anal orifice.

The diagnosis may be made by either a digital examination or by the use of a pneumatic proctoscope, combined with the symptoms elicited from the patient. Sometimes it is necessary to place the patient under a general anesthetic. Great gentleness should be exercised in order to avoid the danger of rupturing the diseased bowel above or below the stricture.

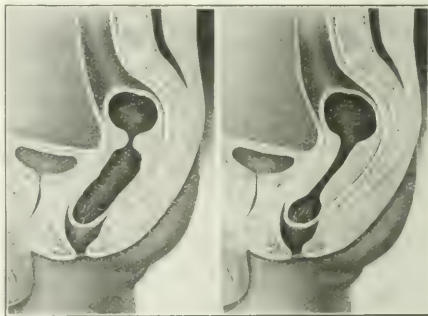
Cancerous stricture which has not undergone ap-

parent ulceration may be differentiated as a firm, inelastic, epithelial growth; *inflammatory* stricture may be accompanied by fever or other constitutional disturbances and supply a history of disease in or about the rectum prior to the formation of the stricture.

Sarcoma is developed from the underlying connective tissue stroma and assumes the polypoid or rounded ball-like shape, seldom annular in form.

Syphilitic stricture is more widespread in its growth, being a proliferating process, and does not assume the band-like characteristics of cancer.

In some instances, however, cancer may involve the mucous membrane by metastasis at several points above or below the stricture, but never so



Annular stricture of the
Rectum.

Tubular stricture of the
Rectum.

From "Diseases of the Rectum and Pelvic Colon."—Bodkin.

extensively as syphilitic infection during the same period of growth. Cancer may push a portion of the healthy mucous membrane before it and give the impression of a connective tissue tumor (sarcoma), but at some place on its surface the epithelial nature of the growth will be discovered in the form of an ulceration with broken-down tissue. A *tuberculous* stricture breaks down almost as rapidly as it is formed and cannot constrict the rectum like the hard, firm, inelastic cancerous tissue.

Ulceration of the rectum may be due to a long-continued, severe hypertrophic catarrhal proctitis, to kidney, heart or lung diseases; to diabetes, follicular proctitis, cancer, primary localized tuberculosis, syphilis, chancroids, traumatism secondary to operations, or to simple catarrhal or specific inflammations, any of which may cause stricture.

Acute inflammations of the uterus or its adnexa, following operations or otherwise, in which a pelvic abscess burrows down into the pouch of Douglas and invades the rectal wall, sometimes produce stricture. A very severe cellulitis or a peritonitis in

this region may result in several strictures at different portions of the rectum or sigmoid flexure.

Traumatic stricture occurs most frequently as the result of operative procedure within the rectum, or from hemorrhoids. Surgeons who operate by either the ligature or clamp-and-cautery methods too often remove so much of the redundant tissue that when subsequent contraction occurs a stricture at the anal opening is almost inevitable. Infection and inflammation following either of these operations are commonly the cause of stricture.

The treatment of stricture is largely dependent upon the causes, which may be constitutional or local.

290 CLINTON AVENUE.

INFECTIVE PANCREATITIS.

Whether we regard chronic infective pancreatitis as a surgical disease will depend upon our acceptance of the general belief that, as a rule, it is secondary to infective disease of associated organs. For there is nothing that we can do in the way of direct attack upon the pancreas that will promise relief. In the cases, relatively rare, of obstruction of the common bile duct by the swollen or indurated pancreas at the point where the duct tunnels the retro-duodenal portion of the head, as it does in two-thirds of all cases, it is manifestly proper to perform a short-circuiting operation in order that the bile may be conducted into the intestine. This is best effected by an anastomosis between the gall bladder and duodenum. In case of doubt as to the feasibility of this operation the stomach may be used, or failing this, the intestine. If the gall bladder has been removed or is too much diseased the common duct must be implanted into the duodenum. But these are operations not for chronic pancreatitis per se but for the consequences of chronic pancreatitis. When the pancreas has reached the stage of induration with deposits of fibrous tissue between the acini or lobules, with atrophy of the parenchyma, cure is no more to be thought of than in contracted kidney. The damage is done and nothing remains but palliation.—JOHN B. DEEVER, in the *Boston Medical and Surgical Journal*.

COLONIC MASSAGE.

Prompt emptying of any part of the colon by massage is a fallacy. This is especially true of the low cecum, which is usually inaccessible and is often pushed lower and filled fuller than before. The good effects of massage are found in a mashing up of the intestinal contents and a stimulation of muscular tone and slow peristalsis, which usually drive the contents slowly forward for several hours.—F. W. WHITE, M. D., in the *Boston Medical and Surgical Journal*.

TECHNIC FOR THE REMOVAL OF DEAD TEETH.

JOSEF NOVITZKY, D.D.S.

SAN FRANCISCO, CAL.

The dangers of virulent pathogenic organisms in the jaws are now generally recognized by physicians. Not so generally recognized, however, is the fact that if all men were subjected to Roentgen ray examination, very few of them would be found free from dental pathology directly due to dead teeth.

Resulting from septic conditions in the jaws there may be many metastatic sequelæ,—septic bronchitis; asthma; pneumonia; "rheumatic" joints, muscles, and nerves; heart and kidney lesions; skin eruptions; chronic toxemias; bacteremias; and anemias have been repeatedly traced to dental pathology.

The dangers incident to diseased jaws have been very great in America. And they may be about to become very much greater. The dangers have been great, because American dentists have made a practice of devitalizing teeth and allowing them to remain in the jaws. The dangers may be about to become greater, because American dentists at the present time are devoting much attention to various methods of treating dead teeth; with the new methods of treatment there may come a greater tendency to devitalize teeth and to retain them in the jaws.

Dangerous septic conditions in the jaws are due to dead or devitalized teeth. Such dangerous conditions are bound to increase as long as dentists concentrate their energies on various methods of treating dead teeth even when such teeth are in advanced stages of dissolution.

There should be no question about what a dead tooth is. Some attempts have been made to discriminate between dead teeth and devitalized teeth. Now a devitalized tooth is one from which the pulp has been removed. Such a tooth, men claim, is not necessarily dead. They maintain that the human tooth has two sources of nourishment, the pulp and the pericemental membranes.¹ This claim has nothing to support it; for as soon as the pulp supply of a tooth is interrupted the dentin of the tooth dies. The tooth bone or dentin is cut off from the blood supply of the body. Only by way of the apical foramen can blood or blood fluids enter the pulp chamber of the tooth. After a tooth is devitalized, cementum continues to be deposited on the tooth root from the cementoblasts of the

¹ Brophy: Oral Surgery, 1915—Page 754.

tooth socket. It continues to hold the pericemental fibers in place against the tooth root after the pulp supply has been cut off.

It is impossible for dentin to receive any nourishment through the cementum. Normal cementum is a mere calcic cement substance possessing no inherent genetic powers. Normally it lacks lacunae and Haversian systems. It is possible that a protoplasmic fluid penetrates through the openings for the pericemental fibres part way through the cementum. This fluid does not reach the dentin; but even if it did, it would not be capable of preserving vitality in the dentin. A pulpless tooth invariably becomes dry, foul and discolored. In examinations of thousands of dead teeth I have not discovered one which has failed to show deleterious changes in the dentin some years after the pulp supply was cut off.

Deleterious changes often fail to attract attention because they may take place very slowly. Nevertheless, these changes will take place no matter how thoroughly a devitalized tooth is embalmed, no matter how skillfully it is treated, no matter by whom it is "preserved." It will become dry, opaque, discolored, solid in its socket and offensively odorous. Treatment may retard decomposition of the organic matter of the tooth, but it will not prevent decomposition. Any student of bacteriology will realize that the embalming of the dead organic matter of a tooth so that the tooth may be retained in the mouth without danger of infection and putrefactive changes is practically impossible, because one end of the tooth is in the mouth with unlimited opportunities for the entrance of micro-organisms into the dentinal tubuli.

Brophy's work on oral surgery published in 1915 has done much to spread misinformation regarding dead teeth. Brophy states that "pulpless teeth which are firm in their sockets, even those teeth which have caused antral infection, may be, with skillful treatment, made sound, healthy and useful and not influence a recurrence of dento alveolar or antral disease."² Brophy states further that though diseased teeth may have been the prime cause of abnormalities in other parts, nearly all are amenable to successful treatment. He adds, "with the present advanced knowledge of dental pathology it is assumed that a tooth canal is rendered aseptic," following canal work.³ Brophy admits that dento alveolar abscess is not a disease of the tooth, but that it has its inception in a tooth. He believes, however, that our knowledge of advanced modern dental pathology is sufficient apparently to treat a

dento alveolar abscess without a removal of the tooth. *A practice which, he trusts, may soon become obsolete with all intelligent practitioners.*⁴ The key to Brophy's false conceptions will be found in his statement that "a pulpless tooth is not a dead tooth because it is held in vital relation with the circulation by the pericementum."⁵

Were it not for the fact that Brophy is quoted endlessly by the members of both the medical and the dental profession, his shortcomings might have been overlooked. But constant quotation has spread much harmful misinformation. If Brophy had had much personal experience with the embalming of dead teeth he would have known that they all "stink" some years after treatment. He should have learned from the works of Black, Noyes, and Hopewell Smith, even if he did not learn it from clinical experience, that tooth dentin dies once the pulp is destroyed.

Dental students are taught to retain dead teeth in the jaws because dead teeth are useful as organs of mastication. They are taught that their problem is to sterilize dead dentin so as to prevent suppurative and putrefactive changes in the tooth and the surrounding parts of the jaw.

Dead teeth and disintegrated bone at their root ends cannot be effectively treated and drained through the root canals of the teeth. Through a minute opening one attempts to drain an area usually filled with fibrous granulations and different strains of micrococci. It may be possible to render such an area temporarily passive. Putrefactive changes may be retarded and the tooth and the area may be called "cured." But several years after the "cure" pathogenic organisms are commonly found in the apical region of the tooth. When the "cured" tooth is opened the patient commonly perceives a very unpleasant odor and the operator protects himself with a face mask.

With great care extracted teeth have been sewed into a cock's comb to be kept "vital." Then they have been prepared for implanting in a 98° Fahrenheit normal saline solution. Great care has been taken not to injure the "vital cells" in the cementum. Some years after the implanting no roots were left. The crowns of the teeth, discolored and offensive in odor, have rolled into the mouth. Results not worse have been obtained by me from a tooth boiled from half an hour to an hour before it was implanted. And of course no one would hold that a boiled tooth is not a dead tooth. Every tooth from which the pulp has been removed is dead in

² Brophy: Oral Surgery, 1915—Page 466.

³ Brophy: Oral Surgery, 1915—Page 254.

⁴ Brophy: Oral Surgery, 1915—Page 764.

⁵ Brophy: Oral Surgery, 1915—Page 754.

the generally accepted sense of the term. Every devitalized tooth is a dead tooth.

Infection and putrefactive changes take place in dead teeth irrespective of whether or not they are left sterile following the canal work. Acid forming micro-organisms probably penetrate through the dentinal tubuli and permeate the dentin irrespective of whether or not bacterial growth takes place from the "treated" pulp canal. Toxins and even bacteria may pass slowly from dead roots into the sponge bone and the blood stream of the jaws. Obscure metastatic disturbances may follow of such a nature that irreparable damage or death may precede or follow the diagnosable stage.

Dead teeth like other dead organic structures are subject to the laws of decomposition. They may serve as organs of mastication, but they should not be retained in the jaws because they are a menace to health and even to life. A micro-organism, a toxin, or a poisonous protein introduced into the blood stream from cancellous bone is far more active than is the same amount introduced into the stomach. Since dead teeth cannot be rendered permanently aseptic, they cannot be retained in the jaws with safety.

Dead teeth should not be removed by the old method of extraction. Extraction, with possibly some curetting, generally fails to eradicate the diseased area. A typical case is that of a patient who had had an abscessed tooth extracted thirty years earlier. A hole in the jaw as large as a pea was shown by the roentgenogram at the place of the extraction. Pyogenic granulations and greenish pus were removed from the area of the old extraction. Gas and offensive odors were noticeable. This indicates why systemic ills thought to be due to dead teeth do not disappear when the teeth are extracted. Certain bone lesions are very difficult to eradicate.

Perforations into neighboring cavities or canals may not be shown by extraction followed by blind probing. Such a method is almost as inefficient as the other method of attempting to drain the areas filled with new growth tissue, toxins, and micro-organisms through the root canal of the offending tooth.

Extraction commonly causes fractures of the alveolar process or of the tooth itself, because a dead tooth is usually partially ankylosed and very brittle.

On account of the difficulty of working in the tooth socket extraction makes complete curettement improbable. In many cases the upper part of the septum separating the roots is still intact.

This prevents the free sweep of the curette. The deeper pathological cavity cannot be reached through the small opening at the apex of the socket, and there is no opportunity for direct vision of the operative field.

Extraction may fail to remove broken down alveolar process and granulations. These may result in systematic toxemias or bacteremias; or even death resulting from infective thrombosis and embolism following the retention of septic tissue and the opening of the facial veins.

Extraction may fail to disclose such complications as antral perforations, necrotic antral walls and polypi, and pathologic conditions of canals supplying nutrient arteries and nerves of the jaws.

The incomplete removal of necrotic structures by extraction may result in extensive loss of alveolar process caused by chronic low grade suppuration.

Extraction may fail to remove all the pathological area. This in some cases will cause eburnation of the surrounding alveolar process. This increases the difficulty of diagnosis which can be made only by an exploratory operation.

We conclude, then, that dead teeth in which putrefactive changes have taken place should be removed from the jaws; but such dead teeth should not be extracted or pulled as is commonly done.

Infected dead teeth and alveolar process should be removed by a surgical dissection.

The technic to be employed in dissecting out a dead tooth is as follows:⁶

In order to gain space for operating it may be necessary to stip down the gums and periosteum from the healthy tooth on each side of the necrotic one. If this is done the gums must be carefully sutured back to their original position at the end of the operation.

Or it may be necessary only to raise and pull back a triangular flap with its apex at the gingival margin of the necrotic tooth so as to expose the outer plate of bone for a little more than the length of the root.

When the outer plate of bone is exposed part of

⁶ Articles by the author on this technic can be found in the Pacific Dental Gazette, May, 1915.

California State Journal of Medicine, Nov., 1915.

Pacific Dental Gazette, Feb., 1917.

American Journal of Surgery, August, 1917.

American Journal of Surgery, September, 1917.

Journal of the Cal. State Dental Association, Nov., 1917.

The author has advocated dissection instead of extraction in

addresses before the

San Francisco District Dental Society, March, 1915.

Surgical Section of the S. F. County Med. Society, May, 1915.

Panama Pacific Dental Congress, August, 1915.

St. Luke's Hospital Diagnostic Section, Dec., 1916.

Surgical Section of the S. F. County Med. Society, Jan., 1917.

San Francisco District Dental Society, Oct. 8, 1917.

Surgical Section of the S. F. County Medical Society, Oct. 16, 1917.

Also a paper now in the hands of the editor of the Dental Items of Interest.

it is removed with a chisel so as to expose the cancellous bone and the tooth root. The root may often be used to guide the operator to minute drainage ways into neighboring cavities or canals.

If the part of the buccal plate which is removed is not so long as the root of the tooth, the tooth is hooked out sidewise before the apical exploration, is made and the curettement done. If the part of the buccal plate over the entire root length is removed the tooth is hooked out sidewise either before or after the apical exploration and curettement.

At this stage of the operation the region may be blocked off by sterile sponges so that specimens of granulation tissue and pus may be obtained.⁷

When a cavity is discovered beneath the tooth roots, the tooth and the alveolar septum in multi-rooted teeth are removed with a chisel. The inner plate of the jaw is left intact. When the antrum is affected the inner plate may sometimes be cut away in the upper jaw enough to permit the inner flap of mucous membrane and periosteum to be drawn over to meet the outer flap. Then the operation is completed and the wound closed. But ordinarily the inner plate should not be removed. In it bone regeneration does not take place so nicely as in the outer plate, at least not when both plates are removed at the same time.

Antrum incisions are sutured. The cavity drains through the natural ostium into the nose. The antrum is not packed with gauze unless hemorrhage is excessive. Five or six days after the operation the cavity may be irrigated, if this is necessary. A cannula inserted through the flap from the mouth, or through the thin plate of bone under the inferior turbinate of the nose will allow thorough irrigating.

The operation for the removal of dead teeth may be performed under novocain anesthesia without pain to the patient and with very little shock.

Objections have been brought to this operation on the grounds of bad cosmetic results, the loss of masticating surface, and the lack of alveolar process on which to support a plate.

If the operation is properly performed there can be no bad cosmetic results, for in place of the diseased bone which has been removed new bone forms and fills in the space.

The removal of dead teeth does, of course, mean the temporary loss of masticating surface. However, a sanitary removable bridge or a skeleton plate

will generally furnish sufficient and efficient masticating surface.

The loss of foundation for an efficient plate will invariably be more pronounced where inadequate surgery has been done than where complete surgery has been done. Incomplete removal of septic granulations results in a chronic low grade suppuration causing resorption of the alveolar process. If no systematic complications were to follow, the local destruction would be enough to deter thoughtful operators from inadequate attempts at relief.

There are no good reasons then for objections on the grounds of bad cosmetic results, the loss of masticating surface, and the lack of alveolar process for supporting a plate. But even if such objections were justifiable, they would appear to be trifling since the removal of dead teeth is absolutely necessary as a means of preserving normal health and even life.

Five distinct advantages of the operation here advocated are:

1. It never results in fractures such as commonly result from the "pulling" or extracting of ankylosed teeth.

2. The operator has direct access to the diseased bone. This permits him to do the necessary curettement completely and thoroughly. Complete curettement prevents the retention of septic bone and granulations which may result in systematic toxemias or bacteremias.

3. The operation discloses any pathological conditions of the nasal floor, any vents under the antral membrane, any vents into the nasopalatine canals, and any vents into the dental canal of the mandible.

4. The operation prevents the extensive absorption of the alveolar process which may be caused by a long continued low grade suppuration. Extensive absorption of alveolar process may destroy the foundation necessary for an efficient plate.

5. It allows the filling in of the bone cavity with the gum and periosteum flap. This is favorable to rapid healing and bone formation, and is in conformity with the ideas relating to bone surgery in parts other than the jaws.

We have seen that virulent pathogenic organisms generally accompany dead teeth and that many metastatic lesions are secondary to them. We must conclude, then, that dentists should immediately give up the practice of devitalizing teeth and of treating teeth which are dead and necrotic.

The only safe treatment for a dead tooth is removal from the jaw, since an area of disintegrated bone or new growth tissue cannot be properly

⁷ From cultures of abscesses, granulations, streptococcus microgus, bacillus of influenza, staphylococcus albus, and what appeared to be the bacillus of influenza have been obtained during these operations. Also mixed cultures containing the different families of staphylococcus, micrococcus catarrhalis, a diphtheroid bacillus and the Bacillus of Friedlander. Strict anaerobic cultures were invariably negative.

drained and removed through the root canal of the tooth. And even if it could be drained through the canal of the septic tooth, should we have faith in this snag that has caused the trouble, and endow it with a chimerical vitality, treat it with some fleeting antiseptic, and allow it to remain in the body as a culture tube for micro-organisms and a means of escape for bacteria and toxins into the cancellous bone?

Extraction or "pulling" according to the old method, commonly will fail to permit the dentist to remove all of the diseased area. Extraction is fraught with dangers to the patient.

The removal of dead teeth and areas of disintegrated bone should be accomplished by the operation described in this paper. This operation renders certain a clean removal of dead teeth and diseased areas; it results in no harm to the patient; and it commonly results in almost inestimable good.

PREVENTIVE MEDICINE.

The aim of modern medicines, coordinate with the advancement of all the sciences, is the prediction and control of phenomena, the prevention, as inclusive of the cure, of disease. Preventive medicine has no fairer ideal than that contained in the beautiful sentence of Minot: "We have enthroned science in the imagination, but we have crowned her with modesty, for she is at once the reality of human power and the personification of human fallibility."—FIELDING H. GARRISON, M.D.

RECRUITING THE TUBERCULOUS.

One little good has certainly come out of the great mass of evil of this terrible war—that experience in the field has proved that men with slight, old, healed tuberculosis, or doubtful tuberculosis, do not need to be excused from military service, that most cases do well in active service, that they improve in health in the outdoor life, and consequently that our practice in peace has been in error in giving too great weight to slight indications of structural change. If a man presents himself for enlistment who shows slight old pulmonary changes, such changes should be viewed as evidence of bygone disease, cured, and, if the soldier is in vigorous health, to be disregarded in the decision as to his acceptance, and disregarded also in the record of his case, so that if it should unfortunately happen that the man in question should break down with active tuberculosis at a later time his disease will be regarded as incurred in line of duty.—COL. G. E. BUSHNELL, M. C. U. S. A., in the *Medical Record*.

MIND POWER.

The influence of mind on body, of hope and courage and conviction in giving strength and aiding effort is never to be overlooked; and he is a poor practitioner who does not utilize this influence in the treatment of his patients.—*Medical Insurance and Health Conservation*.

DIABETIC RETINITIS.

JOSEPH J. SHAFFER, M. D.,

Louisville, Kentucky.

To Hirschberg belongs the honor of having first given the ophthalmic world the classical clinical description of diabetic retinitis, of which there are several forms: First, central punctate diabetes retinitis, which I consider the typical form of the disease. Second, hemorrhagic diabetic retinitis. Third, diabetic albuminuric retinitis, a mixed type between the first two forms. Fourth, albuminuric retinitis in the eyes of diabetics. Under the latter heading may be included numerous cases in diabetics in which considerable albumen is found in addition to sugar, and the ophthalmic picture is similar to that of albuminuric retinitis from which, in its typical forms, it can seldom be differentiated.

(1) Central punctate diabetic retinitis: In this type the optic nerve head is neither swollen nor clouded. At the posterior pole of the fundus, especially in the macular region, are found numerous ivory white points, spots and stripes which surround the macula in an irregular manner not forming the radiating or star figure which is presented in albuminuric retinitis. These spots are round, oval or irregular in outline; sometimes they are linear or semi-lunar in shape; their margins are often-times serrated. Smaller aggregations of these spots are seen between the macula and the optic nerve head near the superior and inferior temporal retinal vessels. Beyond these vessels they may appear as single spots, but they are much rarer on the nasal side of the disc. Some of them cover the small blood vessels, thus showing that they are within the nerve fibre layer. Rarely a blood point is seen in one of them. Larger white spots are of infrequent occurrence. They appear to remain unchanged for years; their number may increase, yet they never coalesce and form larger plaques or group themselves around the macula in radii. Everywhere between these white areas, fine blood points, stripes or little spots (rarely somewhat larger hemorrhages) may be seen. These blood spots usually extend further toward the periphery than the white spots; they also extend further on the nasal side of the disc and beyond the temporal vessels. The periphery of the fundus appears normal; there are no pigmentary alterations. The vitreous contains no opacities nor hemorrhages.

(2) Hemorrhagic diabetic retinitis: In this form extravasations of blood are almost solely found, but no groups of white spots are visible. As in the

prolonging type the case is clearly defined. The retina and the blood vessels, particularly the larger ones, appear normal. Four different types of hemorrhagic diabetic retinitis may be distinguished: (a) sometimes fine punctiform hemorrhages will be accidentally found when for some reason, as for refractive work, an ophthalmoscopic examination is made, thus urinalysis is suggested when an unsuspected diabetes will be discovered; (b) larger hemorrhages, several millimeters in diameter, which sometimes occur further toward the periphery of the retina, and may enter the vitreous humor and there produce a localized bluish dimness; (c) sudden large hemorrhages in cases in which there is even very little sugar in the urine; fortunately these are rarely observed; (d) hemorrhagic glaucoma, permitting no hope of recovery. Probably it would answer the purpose better to designate this type as retinal hemorrhages in diabetes instead of retinitis, since no evidence of inflammation is observed. Furthermore, it must be understood there are mixed forms in which numerous hemorrhages and white spots are noted.

(3) Diabetic albuminuric retinitis: This form represents a mixture of typical diabetic and albuminuric retinitis. Just as in analyzing the urine albumen and sugar may be found, so there are cases in which an ophthalmoscopic examination may reveal the signs of albuminuric retinitis superadded to the typical picture of diabetic retinitis. In these cases in addition to an opaque and slightly swollen optic nerve head and retina with alterations of the blood vessels characteristic of albuminuric retinitis, there are groups of white spots which are peculiar to diabetic retinitis.

(4) Albuminuric retinitis in eyes of diabetics: It is well known that forms of retinitis may be seen in diabetic subjects which agree in all essential respects with the picture of albuminuric retinitis. Since it is understood that in many (perhaps in most) cases of diabetes, renal infection with the presence of albumen may ensue, and since retinitis is rarely seen in diabetes, it may with great probability be assumed that in these cases the secondary nephritic process which complicates the diabetes produces its own characteristic form of retinitis, viz., an albuminuric retinitis. In other words, there is a purely albuminuric retinitis which is independent of the diabetic process, excepting that it appears in a diabetic subject. Therefore, the term albuminuric retinitis in diabetic eyes, or diabetic subjects, appears the proper one.

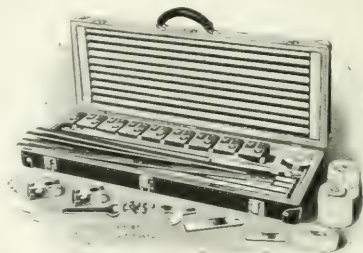
THE MADDON ORTHOPEDIC FRAME.

ROBERT D. MADDON, M. D.

CINCINNATI, OHIO.

Attending Orthopedic Surgeon, Cincinnati General Hospital; and Junior Surgeon, Episcopal Hospital for Children.

This apparatus has been designed to afford the means of obtaining the necessary corrective traction and support for any part of the body during the application of plaster of paris dressings. It combines, in a comparatively simple and portable form, all of the essential mechanical principles of the several types of supports now in use, and will facilitate the application of all forms of jackets, spicas, and other dressings required in general and orthopedic surgery, when it is impossible to use the larger forms of apparatus. No attempt is made to offer any new



methods or radical departures from the classical forms or present application of plaster dressings, except in as far as the use of this apparatus demands minor variations. The portability and possible adaptations are such as to render it ready for almost any service wherever required, and this must be considered of sufficient importance to offset the increased inconvenience in the application of any specific dressing, over that of a portable apparatus designed especially for a single purpose, or one of the large forms of apparatus, adapted to a variety of uses, which cannot be considered as strictly portable.

In its present form this apparatus is composed of the following parts: ten rods 24 inches long, four rods 16 inches long, two rods 9 inches long, two rods 7 inches long, one 7- and one 9-inch rod being joined to make the pelvic post and head post. When screwed up tight they may be considered as forming a 16-inch rod.

Five rods 8 inches long, two rods 4 inches long, twenty cross clamps, four clamp plates, three crutch tops, two pelvic rest plates, six spring rods, four split rings, three webbing

straps and buckles, two webbing bands, one wrench, one carrying case 26½ in. long, 10½ in. wide, 3½ in. deep outside dimensions; weight, 45 pounds complete.

The primary mechanical principles of this apparatus are essentially a horizontal base rod, a vertical head post and a vertical pelvic post, clamped to the base rod; one or more vertical posts, placed beyond the pelvic post, or between the pelvic post and the head post, and clamped to the base rod; one or more lateral rods clamped

any point by means of the clamp, giving a powerful windlass action in all planes parallel or tangent to the base rod. The variations of this form are almost unlimited, provided undue strains are avoided by properly distributing the weight of the patient. The horizontal base rod should be parallel to a second rod when used with webbing bands as a hammock, and should be supported between head and pelvic posts when the



Fig. 1. Plaster Paris Jacket in recumbency, on webbing straps used as hammock.

to any vertical post below and at right angles to the base rod, to form a lateral base; and suitable fittings for all the vertical posts, to support the springs, rods or webbing bands on which the body rests. As this apparatus is intended to be used on a table or in a bed, any form of support other than the lateral rods under the base rod

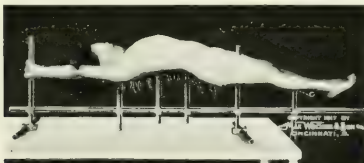


Fig. 2. Plaster Paris Jacket in recumbency on hammock webbing with corrective traction.

is unnecessary, but may be used. Additional support or traction for any part of the body is obtained by extending a rod or rods from a clamp on the base rod, or any vertical post, in any plane at right angles to the base rod or vertical post, and from a clamp on this first rod, extending a second rod in any plane at right angles to the first rod, and attaching to this second rod the supporting fixture, or the bandage, or strap for traction. All rods or posts, not essential members of support, may be clamped lightly at point of extension, and when so clamped may be axially turned in either direction and locked at

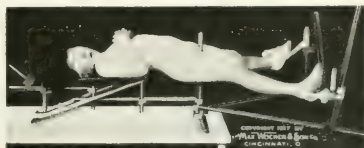


Fig. 3. For Plaster Paris Jacket in recumbency, on Goldblum rods.

patient weighs over 150 pounds. The strain on any rod supported at one point should not exceed 150 pounds when applied at right angles to the

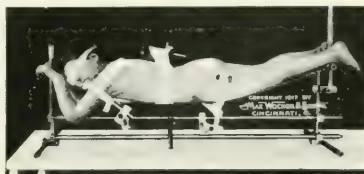


Fig. 4. Hip Spica or Leg Dressings, with or without traction.

axis of the rod, eight inches from the point of support.

The accompanying photographs, taken at the Episcopal Hospital for Children, by Dr. Arch. I.

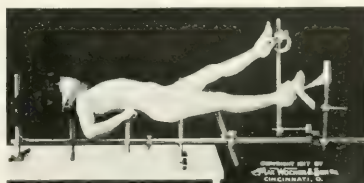


Fig. 5. For Spica, in abduction with or without traction.

Carson, will serve to explain the construction and use of this apparatus. In these photographs the length of the base rod is 4 feet, and the patient a normal child weighing 78 pounds, no effort being made to obtain marked traction or correction.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, MARCH, 1918.

POST-OPERATIVE PNEUMONIA.

The quest for the "safe anesthetic" has been steady and unceasing and is represented by a prodigious portion of current medical literature. The term "safe anesthetic" in the minds of most investigators connotes one which will not kill the patient while it is being administered or, perhaps, immediately after. With exasperating indifference, however, they forget that the greatest danger from an anesthetic is not what it will do on the operating table, but, rather, the remote effects after the patient has been sent to the wards, by far the most important of which is post-operative pneumonia. For every death on the operating table there are 50 deaths from the later pulmonary complication. It seems, therefore, a huge mockery that the "safest" anesthetic is proven now to bring in its wake the largest post-operative mortality. With the exception of a sporadic article, mostly on casuistic or statistical lines, no systematic attempt has been made to study this formidable complication, especially from the aspect of prophylaxis. It is for this reason that we deem the paper of Whipple (*Surgery, Gynecology and Obstetrics*, January 1918) as one of the most important of the past year. In a comprehensive and thoroughly model study, in which all the modern methods of attacking the subject have been commandeered—

namely, clinical, Roentgenological, bacteriological and serological—Whipple makes many original and suggestive observations.

Whipple's article is based upon the study and observation of 97 cases of post-operative pneumonia occurring among 3,719 post-operative patients during the years 1915 and 1916 in Presbyterian Hospital, New York City. The mortality, 2.3%, is unusually high as compared with statistics obtained in previous years at the same hospital. This brings to light Whipple's first important observation, that many pneumonias are discoverable by the x-ray long before frank physical signs of consolidation appear. Such cases are by far the more frequent form of post-operative pneumonia, and this accounts for the high incidence in Whipple's series. In surgical clinics such cases are usually ascribed to "post-operative reaction." There patients show a rise of temperature within 48 hours after the operation unaccompanied by a chill. There is usually a moderate cough. The temperature continues high for a day or two and then drops by lysts. During the first few hours of initial high temperature the radiogram shows a shadow in the lungs, usually in one of the lower lobes. At this time the only physical signs are dulness, with diminished breath sounds. Bronchial breathing does not appear until 24 hours after the appearance of the shadow and after the drop in the temperature. Especially interesting from the bacteriological and prognostic viewpoint is the fact that these pneumonias are due to the Type IV. pneumococcus, the variety that has been found to be only rarely fatal. This type usually occurs in the mouth of otherwise healthy people who have or recently have had an ordinary "cold." Indeed, in a considerable proportion of Whipple's cases the Type IV pneumococcus was found both in the pre-operative and post-operative sputum. This observation led him to make a most important deduction, namely, that patients who have or recently have had a "cold," unless in extreme emergency, should not be operated upon until every evidence of such a "cold" is past. The importance of this deduction is shown in the fact that as many as 21 of the 97 cases were of this class. Furthermore, Whipple lays emphasis on the fact that it is equally important to guard the patient from catching cold after the operation, and he is convinced that many of these pneumonias are due to careless exposure of the patient after being removed from the operating room.

In his fine discussion of the etiology, which is grouped under six headings, that which interested us most was the heading devoted to the method of anesthesia. A large percentage of post-operative pneumonias followed the use of ether; in Whipple's statistics a still larger percentage followed the use of local anesthetics, but this he ascribes to the fact that this method was employed in nearly all cases in which the patient had a "cold." It is a mistake, therefore, according to him, to speak of a post-operative pneumonia as an anesthesia pneumonia or as an ether pneumonia, even though it is the dominant factor. Nevertheless, owing to the notorious irritant effect of ether upon the respiratory mucus membrane he warns against the use of this anesthetic whenever there is the slightest evidence of infection of any portion of the respiratory tract.

There was a mortality of 25.7% in Whipple's series, truly a formidable mortality. Especially depressing is the fact that many of these patients before operation were in good health; of 61 such patients, 9 died. As Whipple says: "Even one such death in any hospital service is a calamity and one not forgotten by relatives or by the surgeon. To have a patient in the prime of life and good health come into the hospital for an operation of choice and die of a post-operative pneumonia is one of the reasons of the dread of the laity for matters surgical."

His studies are to be continued, and no doubt future communications will maintain the interest aroused by this report. At all events, if we have succeeded in stimulating perusal of this lengthy illuminating study we shall for the present be content.

E. M.

ACUTE PERFORATION OF THE STOMACH OR DUODENUM.

In very recent years numerous communications have amply testified to the division of surgical opinion as to the propriety of doing gastroenterostomy at the primary operation in which an acute perforation is closed. The argument is usually built on two criteria: on the immediate danger which the added procedure entails and on the ultimate good which gastroenterostomy is said to ensure.

As regards the first, there is considerable evidence to show that death after acute perforation finds its cause in the shock of the accident and in the subsequent peritoneal sepsis the latter

depending on the interval between perforation and operation. The bulk of experience goes to prove definitely that the addition of the gastroenterostomy adds little, if anything, to the mortality, except in those patients who are desperately ill. As regards the second, men are beginning to believe that gastroenterostomy is not the panacea which it was supposed to be, and the increasing numbers of recurrences of symptoms after operation have led to modifications of, or additions to, the technic and to a more frequent use of other methods of surgical therapy.

There is evidence to show that the mechanism of acute perforation of the stomach or duodenum is analogous to that of acute perforation of the appendix. The gastric or duodenal perforation may take place independently of any pre-existing lesion, or it may occur through the base of an old ulcer. Here one can find the explanation why many of these patients have never had any symptoms before those of perforation and why so many remain permanently well after recovery.

With such a conception it follows that the subject of acute perforation must needs be divorced from that of ulcer, except in those in whom the accident has complicated a pre-existing ulcer. The differentiation of these phenomena, or the determination that both of these lesions coexist, is the primary task of the surgeon whenever, and at the very moment, that a laparotomy is done for an acute perforation. If it can be demonstrated that the perforation is independent of any pre-existing lesion, one may rest assured that simple closure is all that is necessary and that if the patient recovers he will remain permanently well. When, however, an ulcer has pre-existed one may, with equal assuredness, look forward to further symptoms in the period following the convalescence, which will be recognized as the ordinary manifestations of a chronic gastric or duodenal ulcer.

How much better to care for this latter lesion after the dangers of perforation have been safely passed and after adequate study and mature deliberation have been possible. How much better a result should one expect to follow a well-planned method of treatment including therein all the good of medical ante-operative preparation; all the advantages of the proper operation, not hastily done; all the assurance possible for a permanent cure, after proper post-operative care.

A. O. W.

THE NEEDS OF THE MEDICAL SERVICE.

Under the above caption, Lieut.-Col. R. E. Noble, M. C. U. S. A., presented before the last meeting of the Southern Medical Association, a most admirable paper, which convincingly answers the many questions asked of the Department, which have caused perplexing hours of thought with many doctors.

The communication appears in full in the December issue of the Southern Medical Journal and should be read by every doctor in this country.

In a previous paper by the same writer, presented prior to the time that the United States entered the world struggle, as in the above referred to communication, Col. Noble said: "On the medical profession rests a heavy responsibility, for with the medical profession rests the subject of medical preparedness."

This is a particularly impressive paragraph and pregnant with truth, and its meaning should sink deep into the heart of every doctor in America. What was a fact before we entered the struggle is more than a fact now, since we have joined forces with our Allies in a world war, and which will only be terminated by the success of our arms.

We have not a sufficient number of medical officers to care for the combatant and other forces now in training. With the new draft soon to be called and the possibility of the raising of an army of between five and ten million, as has been authoritatively foreshadowed, we would repeat, "On the medical profession rests a heavy responsibility, for with the medical profession rests the subject of medical preparedness."

The responsibility of the medical profession of the United States and its importance in the successful outcome of the war cannot be too forcibly impressed upon every doctor who is mentally and physically fit and within the age limit, and they are urged to offer their services now.

That the Surgeon General should have an immense corps of Medical Reserve officers upon which to draw, enabling him to place the individual where he will be best fitted for the service, is manifestly apparent. This will mean efficiency and by efficiency alone can the responsibility now resting upon the medical profession of this country be lessened.

Apply at once for a commission in the Medical Reserve Corps and thus relieve the responsibility which you owe to your country, your profession and yourself.

CHOLECYSTECTOMY AND
CHOLECYSTOTOMY.

The history of gall-bladder surgery began with timid cholecystostomies, advanced to the bolder operation of cholecystectomy, and continued onwards in a path in which sometimes the one and sometimes the other predominated and became the operation of fashion. It always seemed, however, that cholecystectomy was a more thorough and satisfactory operation in that it could remove more certainly the source of infection and give a greater guarantee against its recurrence. Unfortunately, loyalty to this operation could not always withstand the higher risks of this procedure and when mortality statistics became excessive, there was wavering in the surgical ranks and a return to the simpler operation.

In recent years greater skill and dexterity in carrying out the technic of cholecystectomy has reduced the mortality of this operation to a very low figure and a curious change has taken place. The simple operation of cholecystostomy is being reserved for the patients who are sickest or who are bad surgical risks. Mortalities, therefore, have changed, and the highest mortality is credited to the simplest operation.

One notes with much satisfaction that a sensible view is being taken of this choice of operation in gall-bladder affections. A proper place has gradually been found for each of these two operations and when the indications are well made, each of the two types of procedure are worthy of equal respect.

A. O. W.

WALTER M. BRICKNER, MAJOR, M. C. U. S. A.

The Editor-in-Chief of THE AMERICAN JOURNAL OF SURGERY has responded to the call for service with Base Hospital No. 3. During the period of his absence from editorial duties the responsibility for maintaining the high standards of THE AMERICAN JOURNAL OF SURGERY rests upon the associate editors.

Major Brickner's enthusiasm, literary ability, and excellent surgical judgment have been placed at the disposal of the Government, and the continuation of his work with the AMERICAN JOURNAL OF SURGERY temporarily must devolve upon his co-workers, who will aim to give as good an account of their stewardship as Major Brickner will undoubtedly give in his new field of work.

The associate editors salute their leader, now in the service, and join with the subscribers in wishing him Godspeed in all his new undertakings.

*Read before the Louisville Medical Club, of Louisville, Ky.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

END RESULTS.

What is the end result of hospital treatment? What proportion of patients are actually cured of the conditions for which they enter the hospital? What is the reason for failures? Are hospitals receiving the types of patients for medical and surgical attention which may be benefited to the largest extent under hospital conditions? Are the staffs of hospitals selected with a view to securing the maximum medical and surgical efficiency? Do seniority rules, donations, social standing and medical friendships interfere with the development of the best types of medical and surgical service and result in the exclusion of competents from positions of honor and service? What is to be the basis of determining the character of hospital service and the relative effectiveness of the members of the various departments in hospital organization?

To answer satisfactorily such questions would require the collection of much data, thus far not generally available in medical institutions. The careful analysis of hospital work has revealed numerous shortcomings, most of which can be corrected were the moving spirit present.

The development of the follow-up organizations and the enlargement of social service in connection with large hospitals was the result of a recognition of weaknesses in hospital service which failed to carry a patient from illness through to assured health and continued strength.

A. E. Codman in "A Study in Hospital Efficiency," stresses the necessity of inquiring into the end results of hospital work. The basis of his constructive criticism is the system of hospital organization recommended by the Committee on Standardization of Hospitals of the Clinical Congress of Surgeons. His suggestions are pertinent and throw down a challenge to those responsible for hospital and dispensary work. The successes of treatment are given far more discussion than the failures. The mortality rate of institutions indicates that great advantages are to be derived from an investigation of those conditions in which success has not been achieved.

It is important to fix the responsibility for unsuccessful treatment. According to Codman, the responsibility for surgical failure, although this would apply equally well to medical cases, may depend upon:

1. The physician or surgeon responsible for the treatment.
2. The organization carrying out the detail of the treatment.
3. The disease or condition of the patient.
4. The personal or social conditions preventing the co-operation of the patient.

Obviously imperfections, limitations or failures in treatment may be ascribed to one or more of several causes, including lack of technical knowledge of skill, inadequate medical or surgical judgment, insufficient nursing care or inadequate equipment, and impaired or limited diagnostic skill. Further, causes of unsatisfactory work in or out of a hospital may arise from the incurability of the disease, the refusal of a patient to accept treatment prescribed, or the inexplicable accidents, complications and sequelae over which medicine thus far has not secured control.

Were it possible to scrutinize the case reports of hospitals and investigate the records of dispensaries with a view to ascertaining the part by each or all of these conditions in the end results of their service to the community, there would be a distinct advance in medical and surgical practice. Statistical compilations indicating the number of patients admitted and the number discharged as cured, improved, unimproved, or dead convey merely an idea of gross accomplishment. They fail to point out weaknesses in organization, lack of highest skill, or any other remediable factors entering into the statistical charts.

The suggestion of Codman merits careful consideration and warrants a thorough study of the actual end results in medical and surgical practice. It may be a human frailty to dwell upon one's successes and to ignore or gloss over failures. This, however, is not a characteristic of the man of science. His greatest benefits accrue from pondering over his mistakes and unsuccessful experiments. Facts elicited by the study of end results might be applied in answering the various questions mentioned in the first paragraph.

While the plan of end results has been proposed for organized institutions, the principles implied are strictly applicable to the general practitioner or the specialist in connection with their daily work. A contemplation of the actual end results of treatment, medical or surgical, one year after the cessation of particular medication or operative procedure would be particularly

enlightening. An evening spent in thought upon the failures of specific treatment with a revaluation of methods and technic certainly would carry a reward to be shared by future patients. Too little is known about the end results of medicine and surgery, and every step that will lead to more complete knowledge upon this topic deserves attention. Medicine achieves results which are appreciated, but its failures, even though relatively small in number, merit as much study as those which are termed favorable or successful.

HEALTH INSURANCE

The North American continent has a very much larger percentage of physicians than any European country. It does not as yet boast of any perceptibly higher standard of health. Shall we assume that these standards are not affected by available medical facilities? Isn't this an admission that the medical profession is a useless burden? Or is the explanation to be found in the fact that for lack of proper organization the American people never utilized their medical facilities to their full capacity? Patients without medical aid on one hand—doctors who have nothing to do, on the other. When health insurance brings these two together, we may find that one doctor for every 700 population is not too much, and that every 700 population can afford through collective effort to support a warden of their health, as it will support more than one teacher, minister or lawyer.

Health insurance is not a panacea. Nor is it a secret remedy. It does not promise to accomplish anything that could not conceivably be accomplished in other ways. But it is a simple, practical, common sense, widely tried out, method of marshalling the financial and medical resources of a civilized community in the fight against the vicious circle of circumstances, under which disease breeds poverty and poverty breeds disease. Surely the medical profession cannot afford to be registered in an attitude of opposition to this social reform.—I. M. RUBINOW, in *The Public Health Journal*.

IS MEDICAL SCIENCE A SHAM?

If modern medical science is a pretense and a sham, if inoculations against typhoid and smallpox are mere dangerous fads, if the health and lives of our brothers and sons who have been called to the colors are not in safe hands, then, in the name of common sense let us abolish the medical department of the Army and substitute instead a corps of chiropractors, naturopaths, mental healers and what-not in its place. If, on the other hand, the value and effectiveness of anti-typhoid inoculation and vaccination have been demonstrated and if everything is being done that modern science can do for the health of the Army, then those sheets that are attempting to disseminate falsehood to undermine the morale, not only of the Army, but of the public, and in other ways give aid and comfort to the enemy, should be promptly suppressed by the Government.—*Journal of the American Medical Association*.

Book Reviews

A Treatise on Regional Surgery. Various Authors. Edited by JOHN FAIRBARN BINNIE, A.M., C.M., F.A.C.S., Kansas City, Mo. In three volumes. *Volume 3*. Octavo; 830 pages; 521 illustrations. Philadelphia, P. BLAKISTON'S SON & Co., 1917. \$7.00 net.

Volumes 1 and 2 of this treatise have been reviewed in previous numbers of the Journal. Volume 3 discusses the surgical diseases of the upper and lower extremities and of the chest. One notes with great satisfaction that each subject is described by an expert in the field.

In a general way this volume is perhaps the best of the three. Each subject is treated more in detail, more clearly, and bears the added value of expert experience. The chapters written by Sir Robert Jones are worthy of special mention, and he has added a very timely discussion of the after treatment of the deformities produced by poliomyelitis.

Thoracic surgery is a virgin field. What one knows, what little experience has been acquired by eminent surgeons in all parts of the world, has been diligently gathered and ably described in the article of Lilienthal and Gerster. They bring the subject up to date, and the abundant literature which is quoted will give the student criteria upon which to found personal conceptions of the pitfalls to be encountered and to be avoided and of the methods which, up to the present, have yielded the greatest number of successes in this pioneer field of surgery.

Military Orthopaedic Surgery. Prepared by The Orthopaedic Council. Duodecimo, 234+6; illustrated. Philadelphia and New York, LEA & FEBIGER, 1918. \$1.50 net.

The manuals which are being issued under the supervision of the Surgeon-General and the Council of National Defence is enriched by the volume prepared by the Orthopaedic Council. The subject matter is adapted to the needs of military surgeons and is based upon the practical experience of medical colleagues, who become familiar in service with the numerous orthopaedic difficulties consequent to warfare. Considerable of the material has been taken from the writings of Col. Sir Robert Jones and Col. Edward L. Munson, U.S.A.

The contents cover the care of the soldier's feet, with almost as much stress upon prophylaxis as upon the method of treatment required for disabilities. Chapters devoted to injuries of joints and their treatment have been carefully prepared, and in their brevity might serve as patterns in the preparation of manuals for the use of students.

Particularly valuable are the chapters devoted to ununited and malunited fractures and bone grafting, while the discussion on methods of fixation is especially valuable because of the well-selected illustrative material indicative of the use of splints, plaster paris dressings and other orthopaedic apparatus.

The simplicity and practicality of the volume are no less characteristic than its readability. Its value is greater than that ordinarily attributed to a manual, and its usefulness involves more than military operations.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics, Materia Medica, and Diagnosis in the Jefferson Medical College, Philadelphia. Assisted by LEIGHTON F. APPLEMAN, M.D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia. December 1, 1917, LEA & FEBIGER, Philadelphia and New York.

Always helpful in keeping the profession abreast of current literature, the last quarterly digest lives up to its reputation. Particularly valuable are those sections of the book dealing with topics which are related to war problems. One-third of the book is devoted to the discussion of military surgery, the rest of the contents are

devoted to the diseases of the digestive tract and allied organs, diseases of the kidneys, genito-urinary diseases, and practical therapeutics.

Neurosyphilis. Modern Systematic Diagnosis and Treatment presented in 137 Case Histories. E. E. SOUTHARD, M.D., Sc.D., Bullard Professor of Neuro-pathology, Harvard Medical School; Pathologist, Massachusetts Commission on Mental Diseases; Director Psychopathic Department, Boston State Hospital; Vice-President, American Medico-Psychological Association; and H. C. SOLOMON, M.D., Instructor in Neuropathology and in Psychiatry, Harvard Medical School; Special Investigator in Brain Syphilis, Massachusetts Commission on Mental Diseases; Acting Chief-of-Staff, Psychopathic Department, Boston State Hospital. With an introduction by JAMES JACKSON PUTNAM, M.D., Professor Emeritus of Diseases of the Nervous System, Harvard Medical School. Octavo; 496 pages; illustrated. Boston, W. M. LONARD, 1917.

This volume makes use of the "case history method" of teaching the subject of neurosyphilis. The book is divided into a number of sections dealing with the nature and forms of syphilis of the nervous system, the systematic diagnosis of these forms, the differential diagnosis from other puzzling conditions, and the treatment which is at present thought to be correct. A chapter is added on the manifestations of neurosyphilis which have been seen in the war zones. Finally, short descriptions are given of the tests used in neurosyphilis. On the whole, the book is elementary, and while, perhaps, it may be useful to the student, the method used in presenting the subject matter precludes any scientific discussion, such as would be demanded by the serious and advanced student.

Physical Diagnosis. W. D. ROSE, M.D., Lecturer on Physical Diagnosis and Associate Professor of Medicine in the Medical Department of the University of Arkansas. 499 pages; 294 illustrations. C. V. Mosby Company, 1917.

Rose endeavored to place within the covers of this compact volume the guiding and useful principles of physical diagnosis in general and their particular applicability to the usual diseases of the circulatory and respiratory systems.

Section one consists of the clinical anatomy of the thorax; section two considers the physical examination of the respiratory organs—here are included mensuration of the thorax and x-ray aids. Section four takes up the diseases of the respiratory system. The following section considers the heart. Parts two, three and four are devoted, respectively, to the discussions of the head and neck and the nervous system. The illustrations are clear, apt, and not infrequently original.

The Baby's Food, Recipes for the Preparation of Food for Infants and Children. ISAAC A. ABT, M.D., Professor of Diseases of Children in the Northwestern University Medical School. 143 pages. W. B. SAUNDERS COMPANY. \$1.25.

This little book is a collection of recipes of the most commonly used foods for infants and children. The subject matter includes the recent and established formulae for milk preparations, as well as clear and full directions for preparing many ordinary articles of diet. A few diet lists are appended; also a short chapter on baths and packs for the baby.

Surgical Clinics of Chicago. December, 1917. Vol. 1, No. 6, with illustrations. Philadelphia and London, W. B. SAUNDERS COMPANY, 1917.

This volume exhibits the same general excellence as its predecessors. It contains a large number of excellent articles. Deserving of special mention are the clinics of Dr. Lewis, Dr. Bevan, Dr. Carl Beck and Dr. Eisendrath.

Books Received

Military Ophthalmic Surgery. ALLEN GREENWOOD, M.D., Recently Honorary Lieut.-Colonel, Harvard Surgical Unit with the Royal Army Medical Corps, British Expeditionary Force. Including a Chapter on Trachoma and Other Contagious Conjunctival Diseases by G. E. DE SCHWEINITZ, M.D., Major, M.R.C., U.S.A., and a Chapter on Ocular Malingering by WALTER R. PARKER, M.D., Major, M.R.C., U.S.A. Illustrated. Duodecimo, 115 pages. Price \$1.50. LEA & FEBIGER, Philadelphia and New York, 1917.

An International System of Ophthalmic Practice. Edited by WALTER L. PYLE, A.M., M.D., Philadelphia, Member of the American Ophthalmological Society. **Medical Ophthalmology.** ARNOLD KNAPP, M.D., Professor of Ophthalmology, Columbia University, Executive Surgeon Herman Knapp Memorial Eye Hospital. Octavo, 480+29; 32 illustrations. Philadelphia, P. BLAKISTON'S SON & CO. Price \$4.00.

Radiography and Radio-Therapeutics. ROBERT KNOX, M.D., Consulting Radiologist, Great Northern Central Hospital, London; Hon. Radiographer, King's College Hospital, London; Director, Electrical and Radio-Therapeutic Department, Cancer Hospital, London; Captain R. A. M. C. (T.) 4th London General Hospital (In Charge of X-Ray Department). *Part I, Radiography*, With Seventy-Eight Plates (one in colour) and Three Hundred and Thirty-Seven Illustrations. Octavo, 382 pages. New York: THE MACMILLAN COMPANY, London: A. & C. Black, Ltd., 1917, Price, \$9.00.

A Clinical Treatise on Diseases of the Heart. For the General Practitioner. EDWARD E. CORNWALL, Ph.B., M.D., Attending Physician, Williamsburgh and Norwegian Hospitals; Consulting Physician, Bethany Deaconesses' Hospital; Formerly Professor of Medicine, Brooklyn Post-Graduate Medical School. Octavo; pages 127. Price \$1.50. New York, REBMAN COMPANY, 1917.

A Handbook on Antiseptics. HENRY DRYSDALE DAKIN, M.D., Sc. F.I.C., F.R.S., and EDWARD KELLOGG DURHAM, M.D. Emeritus Professor of Pathology, University of Bellevue Hospital Medical College; Major, M.R.C., U.S.A. Duodecimo, 126+3. New York, THE MACMILLAN COMPANY, 1917.

VACCINE THERAPY.

In the treatment of a moderate number of chronic infections, particularly those of a pustular nature and produced by the staphylococci, vaccines are of greater use than are other methods at our command.

As a rule, autogenous vaccines are preferable and are absolutely necessary, if we wish results in the treatment of colon bacillus infections.

Those who study their cases, who make exact bacteriological diagnosis and who administer autogenous vaccines, with a proper dosage and at correct intervals, will invariably get better results than those who hazard a guess as to the nature of the offending organism, who obtain a vaccine that may or may not contain the causative organism, and who give a dose every day until the vaccine is exhausted.

That performance is *not* vaccine therapy (as defined by Wright), but it is surprising how much of such slovenly practice masquerades under that title.—STONE, in the *New York State Journal of Medicine*.

Progress in Surgery

A Résumé of Recent Literature.

Selection of Cases for Prostatectomy. JOHN B. DEEVER.
at 1000 North Michigan Avenue, November, 1917.

Prostatectomy should be gotten into the best possible condition as regards the functional capacity of their vital organs before operation is undertaken. Of great importance is the development of some method for determining this point accurately before operation so that a correct prognosis can be made.

The immediate general operative mortality in America is 20 per cent., while among the leading urological surgeons it is about 6 per cent. The majority of the poor results followed the perineal operation, these included 38 cases of fistula or incontinence. The chief cause of death is kidney insufficiency, others are sepsis, hemorrhage, vascular breakdown, pneumonia and diabetic coma.

Patients with acute complete retention died if subjected to immediate operation, but with suitable preoperative treatment the patients bore the operation safely. Preoperative treatment has become highly efficient and has been aided by suitable methods of determining the functional capacity of the kidneys. The essential part of the preoperative treatment is bladder drainage. This may be obtained by cystostomy (in the badly infected cases) or by catheter. The latter should be used in cases which are in poor condition, in which cases also a two stage operation is indicated. Cystostomy in the bad cases is usually dangerous.

The fitness of the patient for urological surgery depends on his renal capacity. Acidosis if marked is indicative of uncertain results. In a certain group there are grave accompanying lesions which are suspected only when expected improvement does not materialize after operation.

Chronic Surgical Prostatitis. B. A. THOMAS, *Surgery, Gynecology and Obstetrics*, January, 1918.

Chronic prostatitis may be and is at times a surgical disease, requiring prostatectomy for its most efficient treatment. Associated lesions of the bladder, such a polypoid, papillary or nodular formations of the mucosa of the prostatic urethra and vesical orifice, may be removed at the same time as the prostatectomy is done. For the latter, fulguration or the high frequency spark, promises to offer the best method of intraurethral treatment. In protracted cases of chronic prostatitis, cysto-urethroscopy is always indicated, and may be obligatory for proper diagnosis and treatment.

The Treatment of Gonorrheal Epididymitis Complicated by Peri-Epididymitis. CHARLES S. VIVIAN, Humboldt, Arizona. *Annals of Surgery*, January, 1918.

The author believes in the therapeutic efficacy of epididymotomy for this condition and states that if the temperature does not fall to normal within 48 hours the relief of pressure has not been sufficient. More radical measures are then indicated. These include an open operation and multiple punctures of the epididymis with a blunt probe, with drainage of the organ through these puncture holes by a number of twisted strands of silk—continued for 48 hours.

Gunshot Wounds of the Kidney and Ureters as Seen at the Base. ANDREW FULLERTON. *British Journal of Surgery*, October, 1917.

Wounds involving the hilum may tear the main artery, in which case death may occur within a very short time, or may tear only one of the branches. In the parenchyma there may be a simple contusion, or a tangential wound, or larger or smaller parts may be torn away or extensively lacerated. A tear into the pelvis causes urinary extravasation either into the perirenal tissues or into the peritoneal cavity with a following peritonitis. The

portion damaged or supplied by the torn vessel undergoes necrosis.

Cystoscopy was employed in a number of the cases to determine any loss of function and in the latent cases the presence of injury.

The roentgen ray was employed to advantage to determine the presence of and to locate accurately the position of missile fragments.

Associated injuries were present in the pleura, liver, spleen, spine, hollow viscera, pancreas, and diaphragm. The complications which were seen include sepsis, secondary hemorrhage and urinary fistula. The last occurs when there is a wound of the pelvis, or the tear in the parenchyma extends into the pelvis, or when the ureter is torn.

The chief causes of death were sepsis and secondary hemorrhage. There were 42 cases studied; of these 5 died.

Methods and Results of Transplantation of Bone in the Repair of Defects Caused by Injury or Disease.

ERNEST W. HEY GROVES. *British Journal of Surgery*, October, 1917.

In an excellent review the various theories propounded are described and an attempt is made to show how these really correspond. Much experimental work is described and from all of these facts a number of rules are deduced to aid one in transplantation work.

These include the following: An aseptic technic. The exclusion of all sources of infection including the latent variety. The excision of all scar tissue. A graft taken better from the tibia, fibula or rib and including both periosteum and medulla. In certain cases as with bony structures of complicated shape (head of femur) the graft can be taken from a body dead a short while. The proper preparation of the bone to be repaired is important and a good "fit" of graft and bed should be obtained. The graft should be efficiently fixed with appropriate sutures. In preparing the bed the periosteum should be freely raised to obtain good exposure and to stimulate bone formation. The after-treatment is very important and good support must be afforded until proper healing is obtained.

A Contribution to the Pathology of Projectile Fracture of Limb Bones. E. K. MARTIN and G. F. PETRIE, *British Journal of Surgery*, October, 1917.

From the surface of a divided or fractured bone exposed to infection bacteria may penetrate into the deep parts and the extent of the penetration is apparently unlimited when the fracture is untreated. Penetration is much reduced or prevented when the dead surfaces in a fractured bone are removed. It is increased by obstruction to drainage and particularly for anaerobes by reduction of the circulation. The order of frequency and power of penetration of the bacteria found is (1) streptococci, (2) staphylococci, (3) anaerobes and (4) colon bacilli. The rate of penetration is at its maximum during the first few days. Bruising does not appear to facilitate the penetration if the surface layer of debris is removed and drainage established. In a septic fracture the growth of bacteria is progressive and may infect a distant part as, for instance, a joint.

Chronic Internal Hydrocephalus: The Newer Methods for Its Recognition and Treatment. CHARLES A. ELSBERG. *Interstate Medical Journal*, December, 1917.

There is considerable experimental and clinical evidence to show that there is a circulation of cerebrospinal fluid and that it follows a regular course. Under normal conditions it is secreted in the ventricles and leaves them to be absorbed from the subarachnoid space of the brain and spinal cord directly into the blood stream.

If the secretion is retained in the ventricles by an obstruction in the aqueduct or in the foramina of Majendie and Luschka, there is an obstructive type of hydrocephalus. The non-obstructive hydrocephalus is divided into that due to hypersecretion and that due to diminished absorption.

A method of determining which of these varieties ex-

ists depends on the amount of phenolsulphonephthalein which appears in the urine within a definite period after injection into the ventricles or subarachnoid space.

In the obstructive types a new channel should be made between ventricles and the subarachnoid space by a corpus callosum puncture. In the type due to hypersecretion, lumbar puncture should be done every few days and thyroid extract should be exhibited in increasing doses. In those due to diminished absorption, treatment is not successful.

Broken Neck. CHARLES E. HAWKES, Providence. *International Journal of Surgery*, January, 1918.

There were 91 cases of fracture of the spine distributed among 86 males and 5 females. The ages varied from 7 to 76 years. Sixty-two died in the hospital, a mortality of 68%.

There were 35 fractures of the cervical spine with a mortality of 77%; 44 fractures in the dorsal region with a mortality of 68%; 13 fractures in the lumbar region with a mortality of 54%. Of the 29 survivors, 21 were more or less crippled by continued motor or sensory paralysis. These were in the hospital for from 7 days to 10 months. The best results were obtained in the lumbar region, the poorest in the dorsal.

Laminectomy was done 23 times with a mortality of 74%. No operation was done in 67 cases, with a mortality of 67%. The cases should not be operated upon as a routine measure. There should be some definite pathological condition demanding operation, indicated by symptoms and by the x-ray findings.

The more important symptoms included unconsciousness, paralysis of different kinds, cystitis and priapism. The length of life after injury was as follows:
Of the fatal cases 14 died on the day of injury;

- 25 died before the tenth day;
- 10 died before the twenty-first day;
- 3 died before the end of the fourth week;
- 10 died beyond the last period.

Fractures of the Spine with Cord and Root Symptoms.

CHARLES A. ELSBERG, New York. *Annals of Surgery*, January, 1918.

In cervical and dorsal injuries with transverse cord symptoms an operation should never be performed until distinct and definite signs of returning sensation and reflexes give proof that part of the transverse diameter of the cord is intact.

In crushing injuries of the lumbar vertebrae, in which the roots of the cauda equina are affected, a laminectomy should be performed as soon as shock has been overcome and after an x-ray picture has been taken. There is considerable experimental and clinical evidence to show that regeneration of divided caudal nerves can occur, and laminectomy and suture of the divided nerves should be performed.

Patients with evidence of an incomplete cord lesion should be operated upon very quickly after the injury unless the signs of interference with function are so slight that no justification for surgical therapy exists, the general condition of the patient is so poor that delay is imperative, or unless the coexistence of other injuries precludes operative interference.

Pulse Rate and Blood Pressure Observations as an Aid in the Treatment of Head Traumas. PAUL R. SIEBER, Pittsburgh. *Annals of Surgery*, January, 1918.

A rapid encroachment upon the intracranial space by any foreign body produces anemia of the brain and medulla and is associated with a psychological response represented by an increase in the general arterial pressure and a decrease in the pulse rate.

The associated intracranial complications are the dangerous factors in fractures of the skull.

When the intracranial pressure equals or exceeds the arterial pressure death results. Frequent blood-pressure and pulse-rate observations not only determine the degree of intracranial pressure, but may be utilized as indications for or against the advisability of relieving the pressure. The latter should be relieved before the advanced stage of medullary compression. Subtemporal decompression is the method of choice for furnishing the desired relief.

With these facts as criteria, fractures of the skull may be classified as those which never show increase of pressure; those with a definite increase in the pressure, and those with advanced medullary compression.

Methylene Blue in the Diagnosis of Acute Perforating Gastric and Duodenal Ulcers. HILLER L. BAKER. *Surgery, Gynecology and Obstetrics*, December, 1917.

As an aid in diagnosis of acute perforating ulcer of the stomach or duodenum. Baker has found medicinal methylene blue of value. He uses three grains to an ounce of water to be swallowed from half to one hour before operation. At laparotomy the green fluid may point to the site of the ulcer as it may be seen to squirt through on manipulation of the stomach or intestine. The greenish discoloration of the peritoneum at once indicates a perforative condition. If the appendix is found to be normal in the presence of such discoloration, the diagnosis becomes obvious.

Gastroduodenostomy: Its Indications and Technic. DONALD C. BALFOUR, Rochester, N. Y. *Annals of Surgery*, January, 1918.

Gastroduodenostomy is indicated when an ulcer involves the pylorus and is associated with obstruction and with ballooning of the duodenum, especially when there is fixation to the pancreas or liver. It is especially called for when gastroenterostomy is not possible because of anatomical derangements. It is desirable when a previous gastroenterostomy has been a failure. The latter should then be divided and a gastroduodenostomy should be done.

The Importance of An Eye-Ground Examination in Infants After Difficult Delivery With or Without the Aid of Instruments. J. A. KEARNEY. *American Journal of Obstetrics, etc.*, December, 1917.

Ophthalmoscopic examination of the eyes in suspected cases of subdural hemorrhage, due to forceps delivery or other obstetric trauma can lead to correct diagnosis at an early stage, that is, the first few days of post natal life. The mild edematous blurring of the upper and lower margins of the disc and the nasal half of the disc and its margins in the first few days after the birth of the child, is characteristic for moderate intracranial hemorrhage. When the latter is marked, the disc changes are correspondingly deepened. Lumbar puncture obtaining a bloody cerebro-spinal fluid is additional evidence of intracranial injury. Early decompression and drainage may save a great deal of the spastic type of paralysis which is estimated to result in 70 per cent. of the cases as due to congenital trauma.

Uterine Fibroids With Reference to Their Tendency to Become Sarcomatous. FRANK WARNER. *American Journal of Obstetrics*, December, 1917.

Of 100 consecutive cases of uterine fibroids, Warner found sarcoma twice and in five cases the leiomyomata showed a strong disposition to sarcomatous change. Hence, he advises early removal of these tumors.

The Fossa of Rosenmuller from the Rhinological Standpoint. S. N. YANKAUER, New York. *The Laryngoscope*, December, 1917.

In discussing the etiology of the fossa of Rosenmuller to a group of nasal symptoms, in contradistinction to the aural symptoms usually associated with disease of this region, Yankauer describes at length the anatomy and physiology.

The chief lesion in this region appears to be, according to Yankauer, adhesions between the posterior pharyngeal wall and the edge of the Eustachian eminence. These are caused by the union of an adherent adenoid mass becoming adherent to the eminence and later, either through adenoidectomy or the natural retrogression of the adenoids, the lateral comb of the vegetation remains as a bond between the eminence and the posterior pharyngeal wall, drawing the latter forward and upward and decidedly diminishing the volume of the nasopharynx. Behind the adhesions the fossa is changed from an open farrow into a cavity that slowly fills with secretion. This damming-back process is aided by the musculature of the pharynx—the fossa of Rosenmuller corresponding to that part of the pharyngeal aponeurosis which is not covered by the constrictor—the sinus of Morgagni.

The conclusions drawn by the author from his studies of this region are:

1. Diseased conditions of the fossa of Rosenmuller may give rise to a degree of nasal obstruction equally as great as that caused by hypertrophied adenoids, and persistent nasal obstruction after the removal of large masses of adenoids may be explained thereby.

2. Secretions pouring over the tip of the Eustachian eminence, when in front of the salpingo-nasal fold, is indicative of disease in the posterior group of nasal accessory sinuses. Secretion in the fossa of Rosenmuller behind the salpingo-nasal fold, particularly when associated with adhesions in this region, may cause a clinical picture closely resembling disease of the accessory sinuses, even though the latter are entirely free from pathological changes.

3. It is not impossible that a fossa whose drainage is obstructed may be the focus of a general systemic infection.

4. Reflex nasal and laryngeal neuroses may have their origin in this region.

Nasal Septum Deformity in Children. A Study of 314 Children. LOUIS G. KAEMPFER, New York. *The Laryngoscope*, December, 1917.

Examining several hundred children in the first four years of life, the author found a surprisingly large number with septal deformity of slighter or greater degree.

In summarizing the theories that have been advanced to account for the deformity, he agrees with Yankauer that it is a mechanical change dependent upon a slight primary difference in the width of the nares and an accentuation of that difference by the gradually increasing negative pressure on the narrower side. He differs with him, however, in his interpretation of the mechanism of the process.

The deformities are divided into two groups—patent deviations and "thickened" septa, a group of borderline cases which he thinks may later develop into deviations. He deduces the significant fact that while in the younger children these borderline cases predominate, as the children grow older they become fewer and the true deviations increase.

Another point that the author makes is that the deformities occur with somewhat greater frequency associated with enlarged or diseased tonsils. He thinks that the removal of the tonsils and adenoids in children with "thickened" septa—that is, in children where there is a tendency toward the development of deviation—may have a deterrent effect.

The Intraperitoneal Injection of Saline Solution. KENNETH D. BLACKMAN and KENNETH F. MAXCY. *American Journal of Diseases of Children*, January, 1918.

These authors point out the great need for the administration of water to patients with severe nutritional disturbances, especially after a great loss of body fluids. Often vomiting and diarrhoea prevents the intake of water by mouth or rectum. Intravenous injection may be difficult and it may throw too great a burden upon the circulation if the amount used is large; subcutaneous injection is slow in its results. To overcome these objections Blackman and Maxcy inject water directly into the peritoneal cavity. The amount employed varies with the size of the patient. In very small infants 100 to 250 cc. may be introduced every 12 to 24 hours. Absorption is rapid and is not influenced by posture.

The technic is simple. The patient is placed in a recumbent position, the limbs restrained by a jacket. The spot for injection is just below the umbilicus in the linea alba. The needle is introduced pointing upward and the normal saline solution allowed to run in slowly. A sterile dressing is applied.

The beneficial effects of this form of therapy are apparent immediately. The patient very soon shows the effect of fluid retained. The authors quote 9 cases with very encouraging results.

Ameria from Mercury (Amerie Mercurielle). G. MILIAU and MOUCUC DE SAINT-AVID. *Paris Medical*, September 8, 1917.

The authors cite in detail a remarkable case of ameria following the therapeutic use of protoiodid of mercury for hives. Only two pills were given by mouth, and within 2 days there was a distinct ameria and soon a metallic odor of mercury from the patient's breath. The patient developed an absolute ameria for 2 days. There were no signs of uremia except gastrointestinal symptoms, but there was marked nephritis of an acute type and retention of nitrogenous products in the patient's serum.

They gave glucose intravenously with surprising benefit. Sixty grams of glucose in 200 c.c. of distilled water were administered and diuresis set in promptly and continued for several days.

The Pre-operative Reduction of Epithelioma by Roentgen Rays or Radium. DOUGLAS W. MONTGOMERY, and GEORGE D. CULVER. *The Journal of Cutaneous Diseases*, December, 1917.

A primary radiation with radium is now an accepted principle in the operative treatment of cancer in certain localities, as for example, in the cervix uteri, the rectum, the tongue and lips. In some cases the resulting scarring and deformity may be notably reduced and, when the growths are inoperable, they are brought well within the limits of more easy eradication.

Vincent's Angina. THOMAS HUBBARD, Toledo, O. *The Laryngoscope*, November, 1917.

Hubbard calls attention to the fact that many of the reported cases of Vincent's Angina have been fatal and deduces therefrom that, despite the admirable work of Mayer and others, this disease is frequently overlooked and is often regarded rather as a pathological "curio" than as a common type of infection.

Spirillar infections are common in the mouth and throat and vary in virulence and extent. The group includes the pseudo membranous tonsillitis and pharyngitis, ulcerative tonsillitis and noma. It may invade the cervical glands and causes extensive and fatal necrosis and may extend into the esophagus.

It may in instances be confounded with syphilis or diphtheria and all cases should be studied in the laboratory. The dark field condenser must be employed to distinguish the organism from other spirilla found in the mouth.

The treatment recommended by the author is locally, perborate of sodium in powder, iodine in glycerine and a mild gargle such as Dobell solution. Internally he gives cacodylate of sodium $2\frac{1}{2}$ to 5 grains to be repeated in 24 or 48 hours, and in the malignant cases neosalvarsan intravenously.

The Use of Dichloramine-T in the Treatment of Infections and Infected Wounds. WALTER E. LEE and WILLIAM P. FURNESS. *Annals of Surgery*, January, 1918.

In handling Dichloramine-T or any of its solutions particular attention should be paid to the following points:

All bottles containing the solution previously should be thoroughly dried and should be made of dark glass. No solutions should be returned to the stock bottles. Before using bottles again in which the solution had undergone decomposition they should be cleansed with hot water and dried thoroughly.

Droppers, or glass rods, which are used to transfer any solution from the bottle to the wound should be thoroughly dry before being inserted into the bottles; otherwise water gradually accumulates and hastens the decomposition of the solution.

The general preparatory treatment of the wound is similar to that described by Carrel. The wounds can be rendered sterile and when sufficiently large can be secondarily sutured.

Further Observations on the Results of Blood Transfusion in War Surgery. L. BRUCE ROBERTSON and C. GORDON WATSON. *Annals of Surgery*, January, 1918.

Many cases admitted in an inoperable condition from severe hemorrhage have been rendered operable by blood transfusion. The largest factor in the causation of shock in war wounds is the loss of blood. This does not apply to visceral injuries, however.

Hemolysis occurred in two patients, in one of which the transfusion was done by the citrate method.

The results of transfusion in the series reported are as follows: Life saving, 22; immediately beneficial, but died later from infection or operation, 9; no benefit, 3; harmful, 2.

All of these cases were in a desperate condition and could not have been expected to survive if transfusion had been withheld.

Postoperative Tympanites. J. D. MALCOLM. *Proceedings Royal Society of Medicine, Section of Obstetrics and Gynecology*, 1917, x, 140. (*American Journal of Obstetrics*, February, 1918.)

Malcolm claims that by making a fistula in the cecum or in some other part of the intestine in suitable cases in the course of an operation, the mortality from abdominal surgery may be reduced by a case here and there, and that patients whose lives may be saved in this way are generally suffering from an intestinal obstruction, brought about by a disturbance of coordination between the muscular activity of the different parts of the alimentary canal, aggravated perhaps by mechanical, physiological, or therapeutic hindrances to the flow of the intestinal contents, the colon being the part in which difficulty most frequently arises. He has made a fistula in twelve cases for the prevention or cure of a postoperative tympanites in a series of 1,000 consecutive operations involving the peritoneal cavity. In 554 cases the disease was in the female pelvic organs, the mortality of these being 252 per cent., and the death rate was 3.8 per cent. for all the cases. This would have been at least 4.2 per cent. if post-operative tympanites had never been treated by making a fistula, for life was certainly saved in four of the cases when the patients were beyond all hope of recovering without this method.

THE LYMPHATIC SYSTEM AND TUBERCULOSIS.

The *American Review of Tuberculosis* for February discusses in its editorial the relationship of the lymphatic system to infection and to hypersensitiveness or relative immunity to tuberculosis. Because of its anatomical relationship the lymphatic system, draining every part of the digestive and respiratory tracts from which practically

every tuberculous infection arises, is in itself almost invariably infected either in its vessels or glands. While there is therefore very commonly a deposition of tubercle bacilli in lymph glands there is as yet no good evidence to show that the lymphatic gland or the lymphocyte has a selective or specific antagonistic action on tubercle bacilli. Pigment granules are carried and deposited in the same manner, the difference between the bacilli and granules lying in the fact that the bacilli are alive, able to increase in numbers, and because of their destructive effect upon tissues to be further disseminated through the body. Lack of reactive tubercle formation to bacilli may be found in other tissues beside those of the lymphatic glands. Nor are arrest foci more frequent in lymphatic glands than in the lungs. Intestines, often literally bathed in tubercle bacilli, but remaining uninfected, liver and spleen which rarely show tubercle might be termed immune with equal justice. The only immunity known in tuberculosis, that is, the relative immunity to infection by the tubercle bacillus, is dependent upon a pre-existent focus of infection with the tubercle bacillus. Only such a focus and none of its component parts alone, or tuberculo-protein alone will produce this condition.

Studies in Bone Regeneration. B. BROOKS, St. Louis. (*Annals of Surgery*, December, 1917.)

This experimental study of bone regeneration from bone transplants is based on the use of sodium alizarin sulphate as a vital stain for new bone. The experimental method was the same in all experiments. Dogs were used as the experimental animals. The operations were all done under complete ether anesthesia. The aseptic precautions were such that infection of the operation wounds did not occur in any instance. A defect in the shaft of the ulna was produced by the excision of 20 to 40 mm. of the bone with its periosteum. The bone transplant or implant was placed in the defect of the ulna. In most experiments the bone transplant or implant was fixed in the medullary canals of the fragments of the resected bone. Living bone transplants were always obtained from the femur. These experiments show conclusively that a defect in the shaft of a bone may be quickly and completely regenerated after placing within the defect an autotransplant of living bone with periosteum and endosteum. There is a question whether the transplanted bone matrix and bone cells retain their viability for a short period of time, but there is no question that the identity of the transplanted bone is ultimately lost as a result of absorption and replacement by new bone. If the periosteum and endosteum together with the adjacent layers of bone are removed from the transplant, it has no osteogenic properties. If an implant of sterile dry bone is placed in a defect in the shaft of a bone there is no evidence that such an implant aids in any way the regeneration of the defect. The implanted dead bone neither results in a metaplastic production of bone from the surrounding tissue nor does it possess any specific property of conducting bone growth across the defect in the bone shaft. These facts clearly indicate that the living bone transplant with the periosteum and endosteum is the only type of implant which has osteogenic properties.

An Attempt to Produce Immunity by Transplanting Tuberculous Lymph Nodes Into Normal Animals. G. B. WEBB, C. T. RYDER, and G. B. GILBERT, Colorado Springs. (*American Review of Tuberculosis*, February, 1918.)

Lymph nodes infected with tubercle bacilli were transplanted into normal animals in the hope of conferring immunity. Regional nodes infected from the point of inoculation were transplanted into normal guinea pigs. This acted in the same way as an ordinary inoculation with free bacilli, no increased capacity for resistance, no modification in virulence of the bacilli and no development of the tuberculin reactions before the development of enlarged nodes in the groin of the host were observed. The ulcer over the first implanted node never heals while ulcers over subsequently implanted nodes ulcerate, discharge caseous pus and heal in a very

The living bacilli, which are killed by incubation, does not function essentially as the method with true bacilli. The vicarious lesion does not function as a pre-ventive measure, since the partial immunity which would lead to its own healing.

Autogenous replanting was also tried. A pig was infected with tubercle bacilli as usual in the abdominal wall. Six weeks later the inguinal glands were removed and one replaced under the skin. The incisions healed promptly and eight weeks after the second operation the pig was killed and the second planted node found to be surrounded by a dense fibrosis not observed in any other guinea pig up to that time. One of the remaining inguinal nodes was planted in a fresh pig. This pig developed inguinal node enlargement slowly (4½ weeks), ulceration occurred in about seven weeks and the ulcer remained small and indolent. At autopsy four months later there was dense fibrosis around the planted node and general tuberculosis of the fibroid type different from the usual caseous process.

In the hope of giving the host the products of activity of living bacilli without exposure to infection, infected nodes coated with celloidin were implanted into a second pig. If the second pig was tuberculous and sensitive to tuberculin the operation was followed by a skin condition exactly corresponding to the tuberculin reaction, showing that there had been diffusion through the celloidin coating.

The Principles of Wound Treatment. WEDERHAKE. *Annals of the Association of American Surgeons*, November 27, 1917. (*Medical Record*, February 23, 1918.)

Wederhake offers the following advice after having examined many methods of wound treatment, which he gives to the world as quite original. Free use of tincture of tannic acid for preventing infection of wounds; the use of a concentrated watery solution of potassium permanganate for suppurating cutaneous lesions. Injections of turpentine in the gluteal muscles should be resorted to in streptococcal or staphylococcal infections, and no suppuration arises at the point of injection. Open-air treatment of wounds, they being protected only by a layer of gauze. The use of skin grafts or grafts with hernia sacs in order to accelerate the closure of large torpid wounds. In gas abscesses and gas gangrene the parts should be covered with a layer of sugar and naphthalene after suitable incisions have been made.

Nongonorrheal Disease of the Prostate. M. BARRAGAN. *Medicina Ibera*, November, 1917. (*Journal of the American Medical Association*, February 9, 1918.)

Barragan reviews his experiences with 36 cases of inflammatory processes in the prostate resulting from catheter infection or the catheter going astray; 4 cases consecutive to rectal processes; 4 from foreign bodies in the urethra; 8 from processes in kidney or bladder, and 3 as a consequence of a perineal operation. His two fatal cases were in aged men with septicemia. In the diagnosis he emphasizes the importance of the disturbance in defecation, the desires for defecation occurring almost as incessantly as the desires for micturition, and the act causing intense pains. The pain with acute prostatitis is localized mainly in the depths of the perineum and in the anal region, increasing in intensity at the slightest movement of the muscles, and spreading forward and backward to the lumbar and sacral region. The only relief from the pain is when all the muscles of flexion are relaxed, and we generally find the patient curled up in bed when called in the acute phase.

In his 36 cases a retention prostate catheter was used in 20; in 6 cases the high incision gave relief without infection; in 10 it was followed by infection but an abscess developed only in 4 of the cases; the rest healed with retention catheter. He reiterates that catheterization should be attempted only in men accustomed to the use of the catheter, and in cases of acute retention. Under bed rest, with very hot irrigation under slight pressure of the rectum, (45 or 50 C., 113 or 122 F.) every eight hours, sitz baths and light diet, the general phenomena may sub-

side, along with the tumor felt in the rectum. If they persist, the probabilities are that an abscess is forming, and prompt operative relief is called for unless the prostatitis is known to be of urethral origin. In this case expectant treatment for a time is advisable as the abscess may rupture into the urethra and the danger be over. The perineal route for the operation is preferable from every point of view except that the incision takes weeks to heal and the patient has to stay in bed. The great objection to the rectal route is the danger of hemorrhage liable from the congestion in the region. Routier and Orsaison have compiled 32 cases of prostate abscess, opened through the rectum by ten different surgeons, with no death or secondary infection. On the other hand, two of Desnos' three patients died, one from septicemia and one from hemorrhage.

The after-care, as for acute prostatitis, should never be neglected, especially if the gland feels hard and the surface irregular, testifying to catarrhal prostatitis. Otherwise the prostate disease may become chronic. Tuberculous lesions in the prostate present much the same symptoms as any other chronic form except that initial and terminal hematuria is frequent. The perineal or high incisions are preferable for tuberculous processes. Barragan's article was the leading address at the recent meeting—the fourth congress—of the Asociación Española de Urología. Others mentioned their experiences, bringing to 97 the number of cases of nongonorrheal prostate mischief. It was emphasized that in the gonorrheal cases ascending infection was the rule, while in the others infection was generally of blood-borne origin.

INTENSIVE MILITARY TRAINING

(*Southern Med. Journal*, Jan., 1918.)

The following resolutions were adopted unanimously at a meeting of committees from all states (except Maine and Delaware), held in the Congress Hotel, Chicago, October 23, 1917:

Whereas, The experience through which the United States is now passing should convince every thoughtful person of the necessity for the universal training of young men, not only for the national defense in case of need, but also to develop the Nation's greatest asset—its young manhood—in physical strength, in mental alertness, and in respect for the obligations of citizenship essential in a democracy; therefore, be it

Resolved, by the State Committees of the Medical Section of the Council of National Defense, That they strongly urge the adoption by our Government at this time of a comprehensive plan of intensive universal military training of young men for a period of at least six months, upon arriving at the age of nineteen years; and that this body also support the movement to secure the introduction into public schools of adequate physical training and instruction;

Resolved, That the members of each state committee immediately take active steps to insure public support for the subject of these resolutions through the newspapers, through public meetings and through the appointment of committees in each county; also that copies of these resolutions be forwarded to the senators and members of Congress in their respective states, with a personal request that favorable action be taken at the coming session of Congress upon a measure following the principle of the Chamberlain bill and to become operative as soon as the Army cantonnements are no longer required for the training of the forces in the present war;

Resolved, That each state committee from time to time report to the Medical Section of the Council of National Defense as to the action taken and progress secured in their several states.

It is of interest to note that essentially the same resolution was adopted two days later (October 25, 1917), by the Clinical Congress of Surgeons of North America at their Chicago meeting.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

APRIL, 1918.

No. 4

CHRONIC DISEASES OF THE MOUTH OF INTEREST TO THE PHYSICIAN.

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The mouth is frequently the seat of chronic diseases which may exist for a long period without giving local symptoms. The patient, having no discomfort in the diseased part, is usually unaware of the condition. As no special complaint

classes may be distinguished, the circumscribed and diffuse forms. The circumscribed forms are common and receive special names in dental nomenclature, according to their development or cause.

A. *Chronic Alveolar Abscess.* This is the condition which follows the acute abscess or old-fashioned gum boil. It is due to neglect or unsuccessful treatment and we frequently find sinuses on the face or in the mouth which are, as a rule, the only indications of the lesion. The discharge of pus may be more or less marked,



Fig. 1. Specimen of skull showing bone destruction due to chronic inflammation at the apex of the upper central incisor bearing the crown.



Fig. 2. Case of M. P. showing bone destruction at the apex of the lower central incisor, which has been extracted. A small piece of the bone is shown in the lower right corner.

is made, such chronic diseases sometimes develop under the very eyes of the general practitioner of dentistry. But these conditions which are just the ones which so frequently are the cause of obscure symptoms in neighboring parts or foci of somatic diseases. A review of the pathology and diagnosis of chronic diseases of the oral cavity should, therefore, be of interest to both the stomatologist and the physician.

1. *Chronic Infection of the Jaws.*

Chronic infection of the jaws may be the termination of an acute type, but more often they occur independently, developing and growing without giving symptoms or discomfort. Two

sometimes stopping and then becoming greatly aggravated. The sinus cannot be closed successfully unless the cause of the chronic abscess is removed and this is usually a tooth with a diseased pulp or a necrotic root end.

B. *The Dental Granuloma or Blind Abscess,* one of the most common forms, is a reaction to a mild injury, causing an inflammatory proliferation of the periodontal membrane. It is characteristic of the lesion to start and continue to grow for a long time without the patient's knowledge and without symptoms of inflammation. The granuloma, which grows in the cancellous part of the bone causes a carious condition, illustrated

in Fig. 1. It is attached to the end of the tooth root and surrounded by a fibrous capsule, through which a great many blood vessels pass. The inner part is made up of inflammatory granulation tissue (fibro-blasts and vascular endothelium), infiltrated by a large mass of plasma cells and a smaller number of leucocytes, lymphocytes, eosinophis and mast cells. (Fig. 2.) Epithelium may be found proliferating through the granuloma (Fig. 3), due to the inflammatory stimulation of epithelial remnants from the enamel organ. One or more places may be found where necrosis occurs. Polymorphonuclear lymphocytes then accumulate in large numbers and, if the destructive process becomes extensive, an outlet to the surface or sinus is formed and the condition is evidenced in a sub-acute attack,

localized; and if we consider the frequent occurrence of dental infections involving the jaws it is surprising how rarely one encounters a case of diffuse osteomyelitis. Such a condition, affecting the mandible, is well exemplified in the following case (Fig. 5): The patient, Mrs. L., a woman 26 years old, married and doing housework, had been in perfect health. December 24, 1915, the patient had a tooth capped by her dentist. December 26 the tooth was extracted by another dentist on account of an abscess. December 28 patient went to hospital and received palliative treatment. January 18, 1916, she complained of pain in the lower jaw, inability to open her mouth and soreness of the teeth. Temperature 99.5° F. Examination revealed that the only teeth of the mandible present were the front ones from the



Fig. 3. Case of Mrs. G., showing a periodontal cyst of the lower jaw, caused by a devitalized first bicuspid.

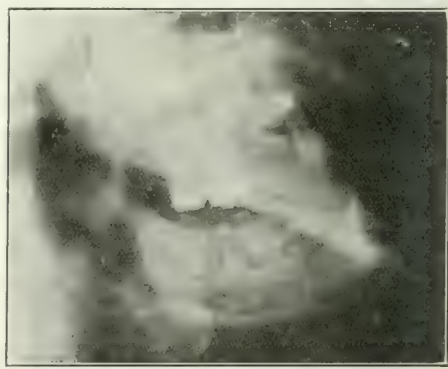


Fig. 4. Case of Mrs. L., showing osteomyelitis of the mandible.

(Fig. 3.) Other retrograde processes are often observed in the blind abscess or dental granuloma, such as fatty degeneration, hyalin formation and, in old granulomata, cholesterol formations, which can be recognized by the rhomboid spaces left by the crystals, which dissolve during the hydration in alcohol. These lesions seldom spread to neighboring teeth, but occasionally grow into periodontal cysts of large dimensions. Toxins and bacteria are absorbed and clinical evidence is at hand to prove that various somatic diseases are due to blood-carried infection or intoxication. The root end most always becomes necrosed and is often partly absorbed, as seen in Fig. 4. This increases the chronicity of the disease and is the reason why medicinal treatment of such teeth is most always a failure.

Diffuse Osteomyelitis of the Jaws. Fortunately the infections of the jaws almost always remain

left lower first molar to the right lower second bicuspid. All these teeth were extremely loose and there was evidence of the right lower first molar having recently been extracted. All the remaining upper teeth were firm and in good condition. Roentgenograms showed a large area beneath the socket of the extracted right lower molar, whence it extended around the chin to the other side of the jaw. Two Wasserman tests were negative. I operated January 20, extracted all the loose teeth and curetted the entire cancellous part between the cortical plates, removing many small sequestra. The wound healed up rapidly. Two more small pieces of bone were expelled later. March 2 the patient returned with swelling and pain on the left side. Another Wasserman test made at this time was negative. A new set of Roentgenograms showed that healing was taking place on the right side, but that

the process of disease had involved the left side extensively. I operated on this side March 3, and from then on the healing continued normally. September 18 two more small sequestra became evident, one of which I removed from the mouth and one from the submental region. The wound healed by first intention. November 25 an abscess seemed to point at the left angle of the lower jaw, where there was also considerable callous formation. By incision and exploration I removed a small sequestrum, but the sinus continued to discharge.

Another set of Roentgen pictures showed a normal condition everywhere except at the left angle of the jaw, where another small sequestrum was found in the middle of the bone. This I removed, excising the sinus and closing the wound, which healed by first intention. The hard

the nose may be only an exciting cause, activating an old and chronic condition.

The upper molars and bicuspid should be roentgenographed in cases of maxillary sinusitis, and the dentist, in turn, should advise his patient to have the sinuses investigated should he find suspicious conditions in films of the upper teeth.

CASE REPORTS.

1. Patient.—Mr. W. W. C.

History.—Pain in zygomatic and infraorbital region and discharge from right nostril. A frontal Roentgen plate showed radiopacity of the right antrum. The cause was ascertained by a film which showed radiolucent areas on two roots of the upper first molar, indicating abscesses.



Fig. 5.—Dental granuloma at the apex of a root showing necrosis of the root end, involving both the cement and the dentine.

swelling on this side of the jaw disappeared gradually, so that the outline of her face is again normal.

Chronic Maxillary Sinusitis. Maxillary sinusitis, especially in its chronic form, occurs much more frequently than is supposed. Patients seek relief from the discharge of pus and other symptoms of acute inflammation, but the chronic disease which manifests itself more indirectly by poor general health, loss of weight, toxemia, mental depression, arthritis, or other focal infections, is quite often overlooked. Maxillary sinusitis may be caused by either diseases of the nose or of the teeth. According to Brophy, about 75% of the cases are due to dental infection, and usually they follow the occurrence of alveolar abscesses on the teeth which are in relation with the sinuses. The teeth, therefore, should always be investigated, and it should be kept in mind that diseases of

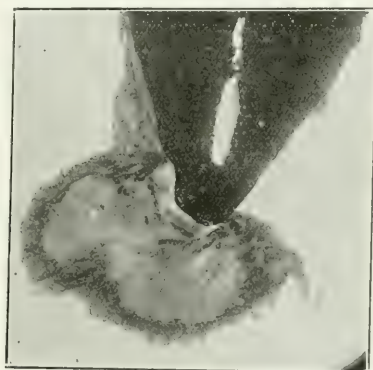


Fig. 6.—Dental granuloma at the apex of a root. Specimen stained with Mallory's Phosphor-tungstic Acid, Haematoxylin, Green. Note the fibrous capsules surrounding the granuloma and several places where necrosis has occurred.

Operative Findings.—The antrum was filled with polypoid growth, the bone over the molar being entirely necrosed.

2. Patient.—Miss G. W.

History.—Complaints of bad taste in nasopharynx, but no pain whatever.

Roentgen Examination.—Intraoral films show many teeth with evidences of root canal work and radiolucent areas, indicating abscess conditions, which extend to the maxillary sinus. A frontal plate shows radiopacity of the right antrum.

Operative Findings.—Large necrosed areas were found in the upper jaw and the mucous membrane of the antrum was covered with granulations.

3. Patient.—Mrs. H. K.

Roentgen Examination.—Routine Roentgen examination shows many diseased roots in the upper jaw and radiopacity of the maxillary sinus.

Operative Findings.—The bone forming the floor of the antrum was necrotic, the antrum being completely filled with polypoid growths.

4. Patient.—Miss A. P.

History.—Patient was in poor health and was referred by her dentist for extraction of the left upper molar. After extraction of the tooth a probe could be passed into the antrum.

Roentgen Examination.—The previously taken films of the teeth showed a large radiolucent area on the roots of the upper first molar. All three molars were devitalized. A frontal plate taken immediately after the extraction showed radiopacity of the left maxillary sinus and a cyst of the right maxillary sinus.

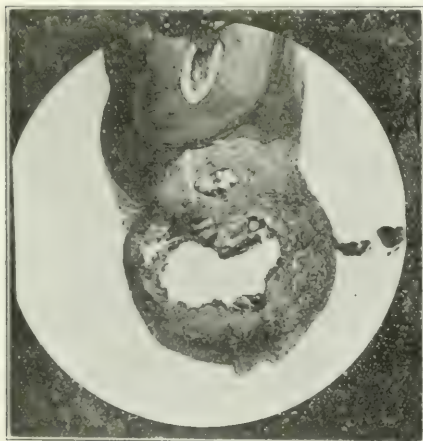


Fig. 7.—Dental granuloma at the apex of a root. Note the epithelium on the right side of the picture and the sinus filled with pus cells, caused by a subacute attack.

Operative Findings.—The left antrum was filled with polypus granulation tissue.

5. Patient.—Miss M. L.

History.—Patient was in a run-down condition for a considerable length of time. Had been under her physician's care for some time, but did not improve.

Roentgen Examination.—Showed indications of many pus pockets and abscesses in the right upper jaw. Frontal plate showed involvement of antrum.

Result of Operation.—After removing teeth and treating antrum the patient improved rapidly.

6. Patient.—Mr. D. G., aged 34 years.

History.—Five weeks before he came to me he started to have rheumatic swellings and pains in the knees. The shoulders were next attacked, and after a short time all the large joints became

involved. He was ordered to take electric baths, which he did, but with no apparent effect. When he was referred to me he was walking on crutches and was in great pain. There was no pain at all in the mouth or face.

Roentgen Examination.—Showed radiolucent areas indicating abscesses on an upper incisor and upper molar. The antrum was suspected, and when a picture taken showed it to be radiopaque.

Operative Findings.—The antrum when opened was found to contain inflammatory granulation tissue, caused by the tooth which was extracted.

Result of Operation.—Patient first suffered exacerbation, due to the surgical auto-innoculation



Fig. 8.—Dental granuloma at the apex of a root. Specimen stained with Haemotoxylin eosin. Note the epithelium on the right side of the picture and the sinus filled with pus cells, caused by a subacute attack.

and had to stay in bed for a few days, not being able to use his joints. He then began to improve, and after seven weeks was entirely rid of all arthritic symptoms.

3. *Cysts.* We distinguish two types of cysts of the maxillary bones—dentigerous and periodontal cysts.

A. *Dentigerous or Follicular Cysts* are of comparatively rare occurrence and are caused by the tooth follicle of an unerupted, impacted, supernumerary or misplaced tooth or tooth germ. They may contain one or many well-formed teeth or rudimentary tooth masses, or they may be formed from the enamel organ without a tooth being developed. They contain no pus unless infected through an opening into the oral cavity.

Periodontal or Radicular Cysts. These are

cysts of inflammatory, infectious origin and are usually formed by an epitheliated dental granuloma. Epithelial remnants of the enamel organ, which are normally found in the periodontal membrane, have a tendency to proliferate when stimulated by chronic inflammation and are apt to grow over the inside surface of the granuloma (Fig. 6). Exudates accumulate in the lumen, and as they increase the cyst grows at the expense of the bone. A Roentgen picture will indicate a cyst clearly, showing a large radiolucent area, usually connected with a tooth, which is devitalized or has a diseased pulp, sticking into it. Multilocular cysts start in a similar manner. They may originate either from the formation of cysts on more than one tooth, or from the development of cysts in various medullary spaces of the cancellated part of the bone, the fluid accumulating and extending them, leaving bone lamellae between. Periodontal cysts are sometimes found unconnected with a tooth root, but in such cases the guilty tooth may have been previously extracted, the cyst having escaped notice, or there may have been only a granuloma at the time of extraction, which later grew into a cyst. I have observed many interesting cases of such cysts, of which I shall cite two typical ones.

The first, a man about 30 years old (Mr. G.), complained of a tender place on the outside of the face, which he noticed especially when shaving. The Roentgenogram is shown in Fig. 7. The operation disclosed a cyst filled with pus containing cholesterol and lined with a membrane which was covered by epithelium. It was found between the two bone plates, but the outer plate had a hole in it, as shown in the Roentgen picture, and this was the place where the patient felt the tenderness.

In another case, that of a Mr. F., the patient was unusually well until about a year before he came to me, when he broke down after a severe attack of grippe, the symptoms being those of nervous collapse. He was in the South for two months and then returned to work. Was examined at Johns Hopkins University and was obliged to give up work again and take a month's vacation in the mountains. While there he had some palpitation and dyspnea and evidently was very anemic. For some years he suffered from hemorrhoids and on Aug. 17, 1916, was operated on by Dr. Chittenden Hill. At this time the blood examination was as follows:

Hemoglobin	70%
Leucocytes	10,000
Red Count.....	3,000,000

Smear showed slight degree of achromia. On Aug. 28 the blood count was:

Hemoglobin	85%
Leucocytes	6,000
Red Count.....	5,300,000

On Sept. 18 the blood count was as follows:

Hemoglobin	85%
Leucocytes	7,000
Red Count.....	5,120,000

The patient at this time had recovered from the operation entirely and seemed in much better general health. The white count, however, seems to have increased again and the red count to have decreased. A Roentgen examination on Sept. 18 showed a large periodontal cyst of the jaw and abscesses about the roots of two more teeth. About 16 years ago the patient had an acute abscess on the left lower first molar, which had to be extracted. The abscess was apparently left in the jaw and grew into the present cyst. After opening into the cyst pus, which apparently was under pressure, escaped at once. The bone cavity was lined by the usual cyst sac and contained the tip of the root of the first molar. I operated on Oct. 4, and on Oct. 11 Dr. E. A. Locke's report shows the following blood count:

Hemoglobin	92%
Red Count.....	5,500,000

The patient was seen again eight months later, when he reported that he had been perfectly well ever since.

The relation of these lesions to the general health of the patient is not in the scope of this paper. A large number of careful clinical observations have proved, however, that many somatic diseases are due to focal infection. The mouth is one of the important parts of the body where such foci occur, and it is essential to understand the chronic oral lesions. Their recognition, treatment and prevention becomes more possible by appreciating their etiology, their histo-pathologic picture and their Roentgenographic appearance.

43 Bay State Road.

A MEDICAL PATRON.

It was not in vain that Froude, the historian, labored to present Henry VIII as one of the most broad minded, sagacious, and just, though arbitrary, rulers of England, when we consider the efforts of this monarch in behalf of scientific medicine. Despite the fact that his vanity was great, his desires brutal and vicious, his tastes sensual, his religion selfish and fickle, he was withal a great monarch, and history cannot but help accord him a place among the world reformers. Henry VIII was a most progressive patron of medical science and was really the father of the movement which led to the formation of army and navy medical departments as we know these organizations today.—HOWARD D. KING, M. D., in *The New York Medical Journal*.

MORULAR OVARIAN NEOPLASMS; THE
SO-CALLED OVARIAN DERMOID
CYSTS: A BRIEF LITERARY
REVIEW, INCLUDING THE
REPORT OF A CASE.

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Ambiguous, indefinite and inexact expressions are not infrequently encountered in medico-surgical nomenclature; and particularly does this seem to be true concerning the descriptive and so-called combining terms commonly utilized in attempted elucidation of uncertain histo-pathologic characteristics. In discussing pathology one should be exact if possible; and it is stated without the least fear of successful controversy that any word with the suffix "oid" (which literally interpreted merely signifies resembling, similar, or like), wherever and however employed in describing histo-pathologic peculiarities, is distinctly unscientific and incorrect. Inasmuch as all three germinal layers are represented in complex ovarian neoplasms, the term morular or blastodermic is suggested as being scientifically exact, it should supplant the words dermoid and dermatoid.

The term "dermoid," in connection with neoplastic formations, appears to have been introduced in 1852 by Lebert, who applied this name to all cystic tumors having a lining wall resembling in structure the external skin. However, the suffix "oid" to denote various other histo-pathologic characteristics has been in common use for centuries; thus the words chancroid, epitheloid, "rheumatoid," epidermoid, mucoid, fecaloid, "neurasthenoid," cancrroid, cheloid, teratoid, and many others equally inexact are familiar to every reader of both ancient and modern medical literature.

For the purpose of discussion morular or blastodermic neoplasms may be divided according to their pathologic anatomy into two distinct groups: (1) simple, and (2) complex. The former are usually small, superficially situated, and contain sebum, serum, oily fluid, and rarely calcareous material. The latter group, which includes ovarian neoplasms, may attain considerable size, and in addition to sebaceous matter may contain many other apparently extraneous substances, such as bone, cartilage, teeth, hair, muscle and nerve fibers, portions of various viscera, etc. As this paper refers especially to com-

plex neoplasms, the simple type need not be further discussed.

Etiology.—The chaotic state of existing knowledge concerning the pathogenesis of various degrees of developmental error represents an unfortunate but inevitable heritage. In the very nature of things it could not have been otherwise, since neither the critical eye of the physiologist, the clinician, the pathologist nor the microscopist has yet been able to visualize the intricate amitotic, cytogenic or karyokinetic mutations incident to progressive embryonal development; nor will the observation of these phenomena be possible until the artificial development of the human ovum becomes a fact instead of a fanciful physiologic dream.

Many ingenious and more or less visionary hypotheses have been evoked in the attempted explanation of the development of morular or blastodermic ovarian neoplasms; and while as already indicated there is yet no consensus of etiologic opinion, an epitomé of a few of the theoretical assumptions may be interesting.

It was at one time believed the presence of a teratomatous or so-called "dermoid" ovarian tumor was positive proof of unchastity upon the part of the possessor; in other words, the idea prevailed that development of a neoplastic formation of this type was impossible in the absence of a matured ovum. The fallacy of this hypothesis later became apparent by the demonstration of such neoplasms at operation and at necropsies upon females too youthful to conceive, and by the fact that similar neoplasms were also found in males. Numerous examples have been recorded in girls less than seven years old, and a smaller number in younger individuals. However, the majority of such neoplasms are encountered in females between twenty and forty-five years of age. Although the neoplastic elements are certainly present at birth, no understandable reason has yet been evolved for the delay in their development.

Waldeyer and others suggested a more or less novel explanation of the origin of morular ovarian neoplasms. It was contended that normal epithelial ovarian cells (undeveloped ovum-cells?) under certain circumstances, and without intercourse of spermatozoa, might undergo a parthogenetic development, during which they furnished—in the direction of imperfect embryonal development—products different from themselves. Just what constitutes the "certain circumstances" which induce the alleged partho-

genetic development does not appear to have been satisfactorily explained. Moreover, the parthogenetic theory fails to explain the development of such neoplasms in organs and tissues other than the ovary. "Epithelial cells cannot produce bone; and teeth only grow from a matrix of cells producing their essential histological parts,—dentine, enamel, and cementum." (Senn.)

Lefert sought to explain the genesis of morular ovarian tumors upon the hypothesis of "plastic heterotopia," and claimed that simple or compound cysts might be found in the most complex organs or in any part of the body which normally did not contain any of the histologic elements composing the neoplasm. This theory is mentioned merely to suggest that it seems absolutely untenable.

Duval and Repin contended there was a special type of ovular degeneration which produced epithelial proliferation of the ovisac and the production of various types of blastodermic neoplasms. This theory also fails to explain the development of such tumors in organs and tissues other than the ovary.

Many authors believe that during embryonal life "the external integument becomes 'pinched' and the part thus caught may be compared to a glove finger turned inside out; the external aspect becomes internal; and we know it is in the inside of the cyst that the cells undergo their evolution and desquamation." (Cumston.) This is virtually the theory of extraneous inclusion of embryonal fragments which has been tentatively accepted as correct by the majority of observers. The theory of Verneuil which presupposes imperfect closure of the branchial or visceral arches is of more than passing interest in this connection.

The so-called "nodal-cell" hypothesis advanced by Bard, were it susceptible of demonstration, might explain the development of complex neoplasms in any part of the body. He claimed there were always present "in the midst of our tissues" embryonal cells which might "split up and give rise to the various types of tissue the germs of which they contained," such as muscle, epithelium, etc.

According to Cohnheim there are numerous embryonal tissues contained within the structures of the body, not utilized during development, and these may give rise to all types of simple and complex neoplastic formations. This

theory of the origin of tumors has enjoyed considerable popularity during recent years, and many pathologists have urged its general acceptance.

Senn says a teratoma is a tumor composed of various tissues, organs, or systems of organs, which do not normally exist at the place where the tumor grows; in the simpler varieties the tumor is composed of heterotopic tissues, such as bone, teeth, skin, mucosa, etc. All such tumors are congenital, *i. e.*, the neoplasm either exists at birth or the individual is born with the essential tumor matrix; a teratoma never arises from a matrix of post-natal origin. A tumor composed of a single representative histologic element may start from a matrix of post-natal origin; but the more complicated matrix of a teratoma has invariably a congenital origin, and is produced in the embryo by errors of growth and by displacement of tissue by inclusion. One of the strongest arguments in support of the correctness of Cohnheim's theory concerning the origin of tumors is furnished by the teratomata. Maas succeeded in producing "dermoid" cysts artificially in animals by implantation of "dermoid" fetal tissue. He produced "dermoid" cysts in young rats by introducing into the peritoneal cavity pieces of skin and parts of limbs of newborn of the same species. After two and a half months he found small cysts containing pus, cholesterin, and hair. The lining of these cysts was composed of tissues representing all the histologic elements of true skin. The endogenous skin teratoma is the most frequent form of fetal inclusion. Portions of the embryonal skin become buried in the mesoblast and are isolated by constriction from the skin, and serve later as matrices for "dermoid" tumors. In many endogenous teratoid tumors the matrix, derived in similar manner, has a more complicated structure, and from it develop teeth, bone, portions of the alimentary canal, etc. In such manner originate, in the interior of the skull, tumors containing striated muscular fibers and teeth. (Senn.)

Cumston observed as to "the actual knowledge that we possess regarding ovarian dermoids, I would say that they are congenital neoplasms having an uncertain pathogenesis, and that the theory of inclusion is probably the correct one; these cysts are more or less aged embryonal débris, according to the complexity of the tissues entering into their structure."

(To be continued.)

UTERINE MYOFIBROMATA.

By J. A. O. BRENNAN, M.D.,
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The title selected for this paper may seem objectionable, inasmuch as it is claimed by certain authors that every neoplasm containing myogenous structure should be classified as a myoma regardless of the presence of fibrous tissue. "Fibrous tumors which contain muscular fibers should be classified with the myomata, and not with the fibromata, as the muscle fibers constitute, from a histogenetic standpoint, the essential part of the tumor. Fibrous tissue is always present in varying proportions, and often is so abundant as almost to obscure the essential tumor tissue." (Senn.)

Myoma was first described as a distinct type of neoplasm by Virchow; it was called muscular tumor by Vogel; such neoplasms were subdivided by Zenker into: (a) myoma-striocellulare, and (b) myoma-lævicellulare, according to whether the muscular fibers were striped or unstriped. From a clinical standpoint, intricate histologic subdivisions are unnecessary and confusing, but may be interesting for the purpose of histopathologic investigation. Personally I think it advisable to retain the combined designation "myofibroma" to represent neoplastic formations composed of both myogenous and fibrous tissues, although it is recognized this may be contrary to the latest histologic teaching. In any event, the term myofibroma seems more expressive than other names which have been proposed.

The favorite site for the development of myofibromata is the uterine wall, and upon anatomic-pathologic and clinical bases the neoplasms may be described according to location as: (a) interstitial, (b) submucous, and (c) subserous. It must be remembered, however, that because of extension primary interstitial neoplasms may later become submucous or subserous in character. While interstitial myofibromata most frequently originate either: (a) in the uterine wall near the utero-cervical junction, or (b) near the fundus uteri, they have been noted in other situations. The neoplasm may be either single or multiple, complicated or uncomplicated, and while more frequently encountered in women between twenty and forty, it may occur at any time. Cases have been recorded at the age of ten years (Biegel).

Uterine myofibromata may early become encapsulated, and extension is naturally in the direction of least resistance,—it may be either

outward or inward depending largely upon tissue resistance and location of the original neoplasm. When it begins nearer the serous than the mucous surface, the growth is usually outward, and *vice versa*. In either event the tumor may eventually become pedunculated. Instances are not unknown where pedunculated neoplasms have finally become separated from the uterus and formed temporary nutritional attachments to surrounding viscera, being then known as "wandering" or "migratory" tumors. It is quite probable some of the myofibromata found attached to the broad ligaments at operation or necropsy were originally uterine tumors which had become pediculated, separated, and eventually migrated to another situation. Primary intraligamentary myofibromata are believed to be exceedingly rare, although it is recognized that the broad ligament connective tissue contains unstriped muscular fibers.

The earliest stage of development of uterine myomata has been insufficiently investigated. Runge traces the origin of such tumors to round "indifferent" cells; Virchow, to a hyperplasia of existing muscular fibers. Kleinwächter found small myomata supplied with muscular pedicles which he believed originated from blood vessels. As endothelial cells cannot be transformed into muscular fibers, such a mode of origin is improbable. (Seen.) "In the majority of cases the tumor no doubt springs from a matrix of myoblasts in the uterine tissue, while in exceptional cases the tumor may start from a similar matrix in the wall of blood vessels. The round cells which have been found within and in the vicinity of recent myomata are fibroblasts, which always take part in the production of a myofibroma."

In size and conformation uterine myofibromata vary within wide limits, and their development may be either slow or rapid, depending upon the vascular supply. In certain cases such neoplasms have been known to exist many years without perceptibly increasing in size, whereas others have assumed huge proportions within a short time. In dense tumors composed largely of fibrous tissue, the pedicle is small and the blood supply is exceedingly meager, hence their growth may be greatly retarded. On the other hand, the softer and more vascular tumors are sometimes exceedingly rapid in development. One removed by Walter had attained enormous size, weighing seventy pounds.

It has been noted that small multiple myofibromata situated near the fundus uteri may exist

for a considerable time without inducing symptoms indicative of their presence. On the contrary, however, cervical tumors may cause alarming clinical manifestations. "Small myomata often produce a complexus of nervous symptoms frequently mistaken for hysteria." Pressure of large neoplasms upon important nerve trunks may produce intense pain in anatomic regions seemingly remote. The so-called sciatica is a common symptom of uterine myofibromata, and patients have sometimes been treated for months before the cause of the pain was ascertained. The uterus is usually sensitive to manipulation and more or less displaced; vesical and rectal symptoms are sometimes pronounced because of pressure effects; in multiple tumors the uterus exhibits an irregular or nodular outline upon palpation.

In the presence of submucous tumors menorrhagia is a most prominent symptom, and later metrorrhagia may also supervene. In the interstitial and subserous types menstrual disturbances are less frequently noted. Irregular uterine hemorrhage should always be regarded with extreme suspicion. It may indicate either myofibromata or malignant disease involving the cervical or uterine tissues. Painsstaking physical examination should be made at frequent intervals in every instance where the patient exhibits any decided menstrual irregularity; in no other way is it possible for the attendant to arrive at a definite conclusion as to the causative lesion. Unsuspected small submucous tumors in the lower uterine segment may be revealed by digital investigation.

Degenerative changes may occur in uterine myofibromata from edema produced by venous obstruction or from thrombosis, followed by ulceration, sloughing, infection, pyemia, and dissolution. Cystic, fatty, hyaline, calcareous and myxomatous changes have been described. The greatest clinical danger, however, lies in the fact that myofibromata are prone to undergo malignant transformation. The period at which malignancy may supervene cannot possibly be foretold, and no rule can be formulated to which numerous exceptions have not been noted. Menstruation, uterogestation and parturition seem to increase the liability to uterine myofibromata, as do also abortions, injuries, and chronic uterine, tubal and ovarian inflammations. The trauma incident to criminal abortion is especially noteworthy in this connection. "Myoma of the uterus has never been observed as a congenital tumor."

The diagnosis of uterine myofibroma is not always so easy as one might suppose. "The progressive anemia which inevitably attends the repeated hemorrhages and bleeding myomatous tumors of the uterus, and the profuse offensive discharges caused by ulceration and sloughing, have often given rise to mistakes in diagnosis, prognosis, and treatment." Small neoplasms may in rare instances remain clinically symptomless for an indefinite period and thus defy recognition despite the erudition of the observer. It would seem that larger tumors which usually produce characteristic signs should involve no especial diagnostic difficulty, yet the converse is true and repeated physical examinations may be required to perfect the diagnosis. Valuable indicative evidence may be afforded by auscultation; where uterogestation can be excluded, introduction of the uterine sound may enable one to differentiate small ovarian cystomata, inflammatory tubal lesions, etc. Microscopic investigation of fragments of tissue removed by curettment may be necessary to establish positive differentiation between benignancy and malignancy in submucous neoplasms which have projected into the uterine cavity. In the interstitial and subserous types tissue fragments cannot be secured for examination without destroying integrity of the uterine wall.

The differentiation between myofibroma and uterogestation sometimes entails the greatest difficulty, the attendant in his anamnestic and clinical investigation being not infrequently willfully and intentionally misled by the patient. For instance in certain cases the woman being desirous of a child may exhibit the usual characteristic signs of cyesis, including mammary and uterine changes, yet careful examination will disclose a non-pregnant myofibromatous uterus. On the other hand, the patient may not desire a child and strenuously deny having submitted herself to the process by which a *terra filius* might have been engendered, who exhibits none of the usual signs of cyesis excepting slight uterine turgescence which might ensue from the presence of a myofibroma, and yet examination may reveal a pregnant uterus. In this connection, the observation is noteworthy that uterine myofibromata offer no certain bar to conception, and the greatest caution must be exercised by the attendant in both diagnostic and prognostic suggestions. Instances are numerous where unfortunate errors have occurred even in the experience of the most careful clin-

icians and surgeons, and many women have been subjected to celiotomy under the diagnosis of rapidly developing myofibromata, the operation revealing uterogestation of three or four months' duration. In other instances under the positive diagnosis of existing cyesis the surgeon has refused to operate, when in reality the woman was non-pregnant and there was present a myofibroma as proven by subsequent developments.

Some of the other "affections that call for special attention in the differential diagnosis of uterine myoma are: Retroflexion, endometritis and parenchymatous metritis, hematocoele, pelvic peritonitis, ovarian tumors, pyosalpinx and hydrosalpinx, chronic inversion of the uterus, retroperitoneal tumors, and malignant tumors of the uterus" (Senn).

While the development of uterine myofibromata may sometimes be arrested when menstruation ceases, it is the height of folly to inform the patient that with the approaching menopause she may expect the neoplasm to disappear. It is known that in some mysterious way such neoplastic formations do sometimes become smaller in size, but the patient may be losing golden opportunities by the delay. Complications usually accompany these tumors, and if not promptly treated by radical surgical intervention they are prone to undergo malignant transformation; but cases are frequently observed where someone has advocated röntgenotherapy and even the use of radium, notwithstanding the tremendous expense of the latter agent. In selected cases marked improvement may accrue from these methods of treatment, and even cures have been reported; but I believe the knife is the weapon of choice; and the earlier the operation is performed the better for the patient and the fewer complications will be encountered with practically no cases of resulting malignant disease.

The application of röntgenotherapy has been reported by some observers as predisposing to malignancy, but I am not in position to verify that statement. While cancer appears to be increasing, this may be explained by our present keener diagnostic ability. Microscopic examination should be made of every neoplasm removed, otherwise I would not think of giving an opinion as to benignancy or malignancy. I have been sadly chagrined after predicting a benign tumor, to later see malignancy develop; and it is for this reason that I always insist upon careful microscopic examination.

Although the x -ray and radium are advocated

in many ailments, I have never been able to convince myself of the value of either in the treatment of uterine myofibroma, excepting as a palliative measure; and this may only delay permanent cure by excision.* We are prone to become too enthusiastic over slight improvement noted in the treatment of disease by newer methods which are constantly lauded in the medical press.

Myomectomy is now seldom practiced excepting in young women who may later wish to conceive. In the majority of cases supra-vaginal amputation will suffice, but when the cervix looks suspicious complete hysterectomy should be performed. The following case is interesting, yet terminated fatally; the neoplasm was thought to be benign at the time of operation, yet proved to be malignant.

Mrs. S., aged forty-five, had suffered pain in the back and along the thighs, and frequent uterine hemorrhages had persisted for many months. She had been twice married; no miscarriages nor abortions; no history of tuberculosis, lues, nor cancer. One child by first marriage living and in good health. The family physician had diagnosed miscarriage, and during the year before the patient consulted me he had frequently packed the uterine cavity, and had given her local treatments of various kinds.

Physical examination disclosed the presence of a uterine myofibroma, also a granulated os uteri. The latter was attributed to the local applications which had been made. The uterus was normal in position and was non-adherent; no glandular enlargements could be detected. Supra-vaginal amputation was performed, and during the procedure enlarged glands were diligently sought and none found. The cervix was not removed as it appeared free from evidence of disease, with the exception noted. The patient made a rapid recovery from the operation, and went home within two weeks.

Three weeks later she complained of right inguinal pain, and palpation disclosed a chain of enlarged and infiltrated glands. Vaginal examination revealed a thickened circular mass surrounding the anterior portion of the vagina, which felt like cartilage. The cervix was in about

*This interest in this subject should read the warning by Stein (see Med. Rec., June 3rd, 1916) based upon a study of the literature ancient the x -ray treatment of uterine myomata. Adverse opinions are quoted from the following authors: Klein, Fessler, Singer, Frankel, v. Herff, Weisswange, Abel, v. Haberer, Iselin, Runge, Rubsamen, Kehr, Futh, Doederlin, Lacaille, Strassmann, Kaufmann, Kaiser, Bretschneider, Hedinger, Shoenaker, Haensli, Mackenrodt, Opitz, Koblanck, Kuntzsch, Walther, Kistner, Berguin, Zoellner, Desplats, Klymens, Bumm, Eymmer, Menge, Hübner, Wetzinger, Bergmann, Nasser, Lacassagne, Albers-Schönberg, Mittelsch, de Boers, Bresselt.

the same condition as before the operation. The patient refused further surgical treatment. She died six weeks after leaving the hospital. I now believe had the cervix been removed along with the uterus, fatal termination might at least have been postponed for a longer period.

Contrary to the views expressed by some of our strictly medical confreres, the medicinal treatment of uterine myofibroma merely represents a delusion. Many drugs and combinations of medicinal agents have been recommended, and some of them have been faithfully tried by those who professed to believe in their efficacy; but the effect upon the neoplasm was shown for the most part to have been negligible. Various preparations of ergot, administered internally and injected subcutaneously, at one time inspired hope of marvelous beneficial effects; but the ultimate outcome failed to verify the refulgent promises portended. Electricity was likewise discarded as practically valueless after a rather extended trial by its advocates.

There has been considerable debate concerning the most appropriate method of approach when dealing surgically with uterine myofibromata. Those who advocate vaginal enucleation, vaginal myomectomy by morcellement, and vaginal hysterectomy, have had ardent followers; but in my opinion the vaginal method of approach can be justified in only a minimal percentage of instances, which may be interpreted to mean that it should be relegated to the position of surgical obscurity where indeed operations of this character have always belonged. No argument thus far deduced in favor of vaginal approach in the surgical treatment of uterine myofibroma has seemed sufficiently convincing to induce a change in my opinion.

Celiotomy with myomectomy, or with partial or complete hysterectomy, in accordance with indications which may be present in the individual case, is the procedure of choice among surgeons of ability and practical experience. The technique of aseptic celiotomy has been so simplified and is now so well understood that both the morbidity and mortality have been reduced almost to the vanishing point. As already intimated, in the majority of cases of uncomplicated myofibromata, supra-vaginal amputation will be productive of favorable results, and this method has the additional advantage of a markedly shortened period of convalescence compared with that following more extensive operations. However, in complicated and late cases, especially

where there is reason to fear malignant transformation has already supervened, complete hysterectomy should be the invariable rule. The patient is thus given the best chance of permanent cure.

In young women the importance of conserving the child-bearing function must not be underestimated, and this constitutes the most rational argument in favor of myomectomy where the procedure is not incompatible with safety to the patient. The advisability of undertaking enucleation of the neoplasm with conservation of uterine integrity must be decided by the surgeon after the extent of the pathology has been determined by visual inspection and digital examination through the celiotomy wound. Even in young women where any serious doubt exists, it is the height of surgical wisdom to sacrifice the uterus rather than subject the patient to the danger of almost certain future malignancy. However, I do not wish to be understood as advocating complete hysterectomy in child-bearing women unless there exist positive and definite indications therefor.

Before closing this paper a few words may be permitted in regard to disposition of the tubes and ovaries where the uterus is removed. I wish to disagree in toto with those who advocate bilateral salpingo-oophorectomy in every instance where hysterectomy is performed, unless it can be demonstrated that the adnexa are involved in pathology which requires their removal in the interest of the patient. The temptation to execute a brilliant operative procedure by making a complete excision is freely admitted, but this should not be allowed sufficient weight to prejudice surgical judgment. Moreover, the importance of the internal secretion of the ovary in maintaining physical and mental equilibrium of the human female must be accorded due consideration. Aside from all this is the well-known axiom that it is our duty to the patient to practice constructive and conservative surgery, rather than the performance of destructive and unjustifiable operations with the sacrifice of healthy structures merely to improve surgical statistics.

CONSCRIPTING THE FIT.

If conscription is to be fair, we must not put a premium on being physically unfit. We must not bring down the standard of the army to get more men, but we must raise the standard of the man so that he can pass the examination, thereby doing our duty toward the man who has kept himself in good physical condition and making the other fellow go who has been exempted for some slight physical defect which might be very easily remedied.—JOHN H. QUAYLE, M. D.

American Journal of Surgery

PUBLISHED BY

SURGERY PUBLISHING CO.

J. MacDONALD, JR., M.D., President and Treasurer

92 William St., New York, U. S. A.

To writers and contributors: Please send the *editorial*, original articles, book reviews, etc., to the Editor, original and duplicate copies to the business letters.

SUBSCRIPTION PRICE, ONE DOLLAR.
FOREIGN, SIX SHILLINGS.

Manuscripts and Contributions should be submitted for publication to the Editor, and should be accompanied by a letter indicating the nature of the contribution and the name of the contributor.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, APRIL, 1918.

A NEW WAR MEDICAL JOURNAL.

The publication of a new journal devoted to medicine is always a maker of interest, and when a government itself publishes one the occasion deserves particular comment. We are led to this remark by the receipt of the first number of a journal entitled "Review of War Surgery and Medicine," prepared and published in the office of the Surgeon General, under the direction of Major M. G. Seelig. An editorial note says that "the Surgeon General has authorized a monthly issue of a limited number of pamphlets devoted to abstracts of war medical literature. The purpose of these publications is threefold: First, to furnish the medical personnel abstracts of original papers of importance; second, to equip the various officers detailed as medical instructors with necessary information in short compass; third, to furnish a medium for the prompt publication of reports which might otherwise not gain circulation, but which have special educational value."

The contents of the first number indicate a high degree of excellence both in the editorial work, its "make-up," and in the fulfillment of its highly important usefulness. The journal is small octavo in size, contains 66 pages (obviously there are no advertisements), and shows capable proof revision. The number contains a number of collective abstracts devoted to war surgery, but

subsequent issues, we are promised, will contain abstracts devoted to internal medicine, laboratory medicine and the specialties. The first article is entitled "Surgery of the Zone of Advance," written by Major George de Tarnowsky, and is based on personal observation. Here is a description of the medical stations and hospitals in various sectors, with a detailed account of the activities ascribed to each station. Tarnowsky lays unusual emphasis on the importance of the knowledge on the part of medical officers of the terrain to be occupied in a contemplated advance. The article is of most unconventional interest to the civilian physician and of fundamental import to the military surgeon. The succeeding article on "Gas Gangrene" is a splendid resumé of the extensive clinical and therapeutic observations that have been made in this war, including the frequent bacteriological and immunological work of Bull and Pritchett. A good bibliography completes this abstract. A resumé of "trench foot" follows, written by Majors L. B. Wilson and W. J. Lyster. The issue ends with a paper entitled "General Principles Guiding the Treatment of Wounds of War." This systematically outlines the conclusions adopted by the Interallied Surgical Conference, held in Paris in March and May, 1917. These rules comprise a veritable "war surgery" in a highly concentrated form.

As far as we are aware, this is the first time in medical history that a government has undertaken to publish a medical journal, and it is a tribute to the discernment of the Surgeon General and his staff that they saw the vast educational possibilities of such a publication. We therefore bespeak for this youngest of our conferees the greatest success. Copies may be obtained from the Superintendent of Documents, Government Printing Office, or from the office of the Surgeon General, for 10 cents. E. M.

DISCHARGING MEDICAL RESERVE OFFICERS.

It has been contended by certain earnest and not well-informed souls that there is no difference between the military and the civil practice of medicine. They blandly ignore the differences in the environment of the patients, the regulated modes of life, on the one hand and the varied and unhygienic surroundings on the other. To them a wound is a wound and a disease a disease, no matter how acquired. Sanitation and the prevention of disease is a closed book, or, at the best, one very little read. The doctor, they maintain, is a healer who follows the armies to take care of

the wounded—one of these writers—we quote him from memory—says the foolishly wounded. It is the medieval camp follower idea grafted upon the more modern peace at any price theory—the more inefficient the sooner the peace—which from one angle is only too true. They decry as unnecessary the long course of training given our doctors who have gone to the camps, and scoff at the formality and “paper work” and at the so-called “red tape” of army medicine. Equally they are at variance with the policy that has failed to keep all and sundry who have offered themselves in the service.

Most of the “red tape” so loudly abused by the critics is necessary for the supervision and maintenance of discipline among a large number of men and for future reference. It is simply the application, in a field in which many of the critics have been doing rather loose and slipshod work, of the methods of organization and efficiency that these same critics so vociferously praise in big business enterprises, of which, incidentally, as medical men they can be assumed to have only superficial knowledge.

Anyone who has had his training in or is connected with a hospital where there is an active acute service is fitted in the main to take his place in the military establishment. He is able to handle patients in large numbers, giving each one the proper care and best attention, withholding nothing of comfort or need from any one of them through hurry or inadvertence, without lost motions and without loss of time. Some men are by nature better equipped for this sort of service than are others, and they make perhaps the best military practitioners. Of those who have not had this training in civil life many can be taught. They come to see the reasons for what they are doing and why and get the proper attitude of mind. Others cannot, and it is this group that the Surgeon General has called “temperamentally unfit” and has relieved from active duty for the better safeguarding of the health of the troops. These surgeons and physicians, many of them excellent and keen practitioners at the bedside, cannot bring themselves to handle men in groups or to command their obedience and respect. It is no more the doctor's fault that after years of practice at the bedside he cannot with minimum expenditure of time and effort be trained to do wholly unfamiliar work than it is the clerk's or mechanic's fault that he lacks the inherent aptitude after he has joined the army to become an expert marksman.

Those whose knowledge of medicine, aside

from its application in their special field, is too limited to form a basis for instruction—in other words, the ignorant—are surely not wanted, and there has been a lamentably large number of practitioners in this country by courtesy of easy diplomas and lax licensing boards. These can be dismissed without discussion excepting to add that they are much sooner discovered under the military than under civil methods of practice.

The profession must endorse the actions of the Surgeon General and, in the name of those who are obliged to stay at home, thank him for his keen discernment of potential powers and courageous attitude in the interest and well-being of our military forces.

L. G. K.

WHAT OF THE MORROW.

With the great host of men now enlisted in the combatant forces in the U. S. Army, and with an expansion by an additional 800,000, as reported, by the end of 1918, and with only sufficient medical officers at the present time to adequately conserve the interest of those now enlisted, we must look to the morrow.

It is not only the service of the young doctor full of the vigor of life that the Surgeon General requires, but those of mature years (up to 55), ripe in the experiences of civil practice and trained in all branches of medicine and surgery, that are so necessary to build up an evenly balanced and serviceable Medical Corps for the various departments, such as general hospitals, base hospitals, cantonments, sanitary corps, etc.

The broader the experience in medicine and surgery the greater will be the service rendered as a member of the Medical Reserve Corps, but to compel the Surgeon General to wait until such a time as dire urgency makes it necessary to beat the drums for the required number, as in '98, will seriously handicap the Medical Department of the United States Army and prove a menace to the lives of those who have so willingly come forward and offered their all in the cause of liberty and true democracy.

Voluntary mobilization of the entire profession within the Medical Reserve Corps, yet each doctor continuing his civil duties until called, seems to be the ideal solution of the problem of providing a sufficient number of experienced medical officers to take care of all of the requirements and expansion as they arise in the various departments under the command of the Surgeon General.

We must all realize by this time that we are in

the war in the finish and the end is a long way off. With millions of men to be further called to the colors, the services of thousands of doctors must be placed at the command of the Surgeon General when needed, and the voluntary mobilization of the entire profession of the United States will enable him to call those most suited for a particular assignment where they will be of the greatest service to their country and to themselves.

Again we would mention that this complete mobilization of the entire profession does not mean that you are going to be immediately called into the service, but it will provide for what is so urgently needed and what the Surgeon General must have, a large force of Medical Reserve officers upon whom to call as requirements demand.

The greatest evidence to the world of the patriotism of the medical profession of the United States would be voluntary mobilization. While the services of all could not be used with the combatant force, the demand for experienced doctors in base hospitals and general hospitals must be provided for, not overlooking the interest of the civilian populace.

Let us prove to the world the patriotism of the medical profession by voluntary mobilization, which in itself would best express to our enemy the determination of this great, earnest and much needed body of men, not overlooking the fact that such an act would accord anything but aid and consolation to those who are now seeking to destroy liberty and true democracy. MACD.

AN INTER-ALLIED SURGICAL SOCIETY.

It was agreed at a meeting held in Paris on November 3, 1917, of delegates of the International Surgical Society from Belgium, France, Great Britain, Serbia and the United States of America, that:

1. The International Surgical Society be dissolved after the publication of the Volume of Transactions of the Meeting held at New York City, April 14, 1917. Should any money remain after the publication of the Volume, such money will be divided pro rata among members. Each member of the Austro-German group will receive his share; but the money belonging to members from other nations will be retained and applied to some object of scientific repatriation in Belgium.

2. A new society will be created after the war on a similar basis, to be called the "Inter-Allied Surgical Society." Surgeons of neutral countries may also be elected members."

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

A VOLUNTEER MEDICAL SERVICE CORPS.

In order to complete the mobilization of the medical and surgical resources of the country the Council of National Defense has authorized and directed the organization of a Volunteer Medical Service Corps. It has been recognized that many physicians possess slight infirmities or are beyond the age limit—55 years—permitting active medical service, but are nevertheless capable of assisting the Government in numerous ways for public and institutional service. The patriotism of the profession seeks for methods of expression, and an opportunity is thus afforded for all reputable physicians and surgeons who are ineligible for membership in the regular officers' reserve corps.

It is intended that this new corps shall be a mobile squadron capable of being diverted to meet such civil and military needs as are not already provided for. Its functions in general will be to assist in the maintenance of the health of the people at home with as great, if not greater, efficiency than that existent during peace times. While thousands of physicians are devoting themselves to the satisfaction of the demands of field and hospital service for military forces, the members of the Volunteer Medical Service Corps will give their time to hospitals, medical teaching, laboratory work, the examination of drafted soldiers, the reclamation of those rejected because of comparatively slight physical defects, conserving the health of the families and dependents of enlisted men, and the preservation of sanitary conditions throughout the country. The very strains upon the medical talent of the country arising from the depleted medical forces remaining for civil life accentuate the necessity for an organization of the character indicated.

The principal measures of service will be gratuitous, but the service will be rendered only in response to a request of the Surgeon General of the Army, the Navy, or the Public Health Service or the head of some other duly authorized department or association charged with responsibility for the welfare of civil communities.

While lives are being offered freely, there is no reason to believe that there will be any hesitancy on the part of physicians to enroll themselves for the giving of their time, thought, and energy in behalf of the public weal.

Any qualified practitioner, intending to join, shall apply by letter to the Secretary of the Central Governing Board, Dr. William F. Snow, Washington, D. C., who will send the applicant a printed form, the filling out of which will permit ready classification according to training and experience. The final acceptance to membership will be by the National governing body.

In any war-winning program the needs of the entire community must be considered. It should be a source of honor to the profession that a considerable responsibility devolves upon it for the maintenance of national health. Only by mobilizing the entire medical profession can this task be accomplished successfully and with an equitable distribution of duties.

Now is the time for physician and surgeon to give evidence of his loyalty to the ideals of his profession and to give tangible expression to his willingness to rally to the support of our national welfare. There should be no difficulty in developing a Volunteer Medical Service Corps, which will reflect credit and distinction upon the individuals comprising it and the nation it serves.

Book Reviews

A Clinical Treatise on Diseases of the Heart. For the General Practitioner. EDWARD E. CORNWALL, Ph.B., M.D., Attending Physician, Williamsburgh and Norwegian Hospitals; Consulting Physician, Bethany Deaconesses' Hospital; Formerly Professor of Medicine, Brooklyn Post-Graduate Medical School. Octavo, 127 pages. New York: REBMAN COMPANY, 1917. \$1.50.

The study of cardiology has developed so rapidly that the literature in its vastness tends to overcome the general practitioner, desirous of keeping pace with the technical investigations of heart action. Cornwall has compiled a brief book aiming to be practical and hence, little attention is bestowed upon various theories underlying cardiac action. The field of diagnostics recognizedly is of the utmost importance, but the most modern work dealing with such topics as cardiac arrhythmias is given inadequate attention.

Much of the subject matter consists of material which had already appeared in published articles by the author, without the degree of expansion, desirable in a volume devoted to this subject.

To discuss the entire field of prophylaxis in less than a page, in the light of its significance at the present time, is entirely inadequate and unsatisfactory.

The field of therapeutics is covered in forty pages, but with a degree of indefiniteness, in many instances, that adds little to the knowledge of the general practitioner seeking enlightenment.

The author recognizes that he has prepared neither an exhaustive treatise nor a digest or compendium. It is difficult to classify the field of usefulness of this volume for its claims to a wide reading public, save its brevity and attempt at practicality.

An International System of Ophthalmic Practice.

Edited by WALTER L. FYLE, A.M., M.D., Philadelphia, Member of the American Ophthalmological Society. *Medical Ophthalmology*, by ARNOLD KNAPP, M.D. Professor of Ophthalmology, Columbia University; Executive Surgeon, Herman Knapp Memorial Eye Hospital. With thirty-two illustrations. Philadelphia: P. BLAKISTON'S SON & CO.

This is the second volume of a seven volume system. The other volumes are: *Ophthalmic Therapeutics*, A. Darler; *Ophthalmic Diagnosis*, Charles H. Beard, M.D.; *Pathology and Bacteriology of the Eye*, Edward Treacher Collins, F.R.C.S., and M. S. Mayou, F.R.C.S.; *Affections of the Orbit and Accessory Cavities*, Christian R. Holmes, M.D.; *Examination and Refraction of the Eye and Eye-strain*, Walter L. Fyle; *Ophthalmic Surgery*, Walter B. Lancaster, M.D.

The volume deals with the relations between ophthalmology and the other branches of medicine and surgery and, to quote the author, "these relations are today closer than ever—the aim of this book has been to give the essential of what is known, of these relations."

The first part of the book is a chapter on the anatomy of that part of the nervous system that has to do with sight and the movements of the eyes. The mechanism of nystagmus as described by Barany is briefly discussed. The diseases of the nervous system in their relation to ocular changes are handled in detail; the portions on meningitis and brain tumor are of special interest.

The chapter on poisons and the one on the infectious diseases should appeal to the practitioner because of their inherent interest and because they suggest possibilities of diagnosis that he is apt to overlook. There is a very instructive section on ocular tuberculosis.

While the book is written from the standpoint of the ophthalmologist, it is also an excellent book for the internist and will likewise remind him of the possible eye complications that he might be prone to forget in their earlier and less patent manifestations.

Manual of Splints and Appliances for the Medical Department of the United States Army.

Compiled by the following board: LIEUT.-COL. WILLIAM L. KELLER, M.C., MAJOR ROBERT B. OSGOOD, M.R.C., MAJOR ALEXANDER LAMBERT, M.R.C., MAJOR JOSEPH A. BLAKE, M.R.C., CAPTAIN W. S. BAER, M.R.C., and CAPTAIN NATHANIEL ALLISON, M.R.C. New York: OXFORD UNIVERSITY PRESS, 1917.

This manual is of pocket size, designed for the use of medical officers in field and hospital and explains in detail the reasons for using these appliances and the methods of their application. A few splints only are described, which by experience have been found to be thoroughly sufficient and efficient in the wounds which are encountered in the present war. The manual does not include any of the appliances which may be found necessary in the reconstruction hospitals.

Medical Research and Human Welfare.

A record of personal experiences and observations during a professional life of 57 years, by W. W. KEEN, M.D., LL.D. (Brown), Emeritus Professor of Surgery, Jefferson Medical College, Philadelphia. Duodecimo, 160 pages. HOUGHTON MIFFLIN CO.

The book comprises a series of lectures delivered under the Colver foundation at Brown University. The discourses concern more of the recent discoveries in medicine, including Pasteur's researches, typhoid fever, tuberculosis, malaria, most of the other infectious diseases, the organs of internal secretion, anesthesia, antiseptics, etc., etc. As popular lectures, these are models of their kind and are full of the charm of diction and rich personal reminiscence for which Dr. Keen is to justly noted.

Progress in Surgery

A Resume of Recent Literature.

Fractures of the Neck of the Femur. WILLIS C. CAMPBELL. February, 1918.

The causes of non-union of these fractures are as follows:

1. Faulty mechanics—the ordinary splinting methods do not meet one single mechanical requirement.
2. Failure in diagnosis until primary union cannot be effected.
3. Depletion of the blood supply of the head, leaving only a small vessel through the ligamentum teres.
4. Syphilis.
5. Too early weight bearing.
6. Difficulty of aligning the short fragment in a fracture into a joint.
7. The synovial fluid has a tendency to prevent callus formation.
8. The psoas muscle may be caught between the fragments.

The Whitman method of treatment is the superior one, although occasionally good results are obtained with any method.

What Are the Real Results of Arthroplasty? M. S. GREGG. January, 1918.

Statistics, including arthroplasties on all joints as a whole, and stating percentages, are unreliable. Each joint must stand on its own merits for arthroplastic procedures. The jaw, elbow, and hip joints, in the order named, give the highest percentage of good results. The knee and ankle give the poorest results and should be subjected to operation only after very careful consideration.

Septicemia as a Complication of Gunshot Wounds. D. M. JONES. January, 1918.

Blood infection occurs more frequently in patients with gunshot wounds than is usually supposed. This may be due to a diversity of organisms and the clinical manifestations may be few or trivial. The tendency to natural cure is strong. The following types of cases are especially worth investigation from a bacteriological standpoint.

1. Cases with wounds grossly infected with the gas bacillus.
2. Cases exhibiting anemia and emaciation with wounds of the cadaveric type.
3. All cases with delirium, apart from those in which the position of the wound is such that the condition is intelligible.
4. Cases with temperature which is not accounted for by the state of the wound.

Removal of a Rifle Bullet from the Cerebellum. J. H. JONES. January, 1918.

A case is described with the object of illustrating the spontaneous movement of a bullet in the brain. The latter is attributed to the following factors: the action of gravity; local brain softening around the bullet or abscess formation; pulsation of the brain tissue. The twisting or version of the bullet is due to the following: unequal softening around the projectile; uneven weight distribution of the bullet itself; encounter with a leash of blood-vessels which would deflect the course of the bullet.

Gunshot Wounds of the Knee-Joint: A report of 100 cases. J. H. JONES. January, 1918.

Early operation, if the procedure be radical, and especially if the entire capsule can be sutured, results, in 94 per cent of the cases, in a sterile joint, and, therefore, in a successful issue. Where a drain is used down to a tear in the capsule or to a cavity in bone, the results can never be depended upon.

The removal of missiles from the joint within the first week, even in the presence of sepsis—other than that due to streptococci—can be followed by immediate suture, and the joint can be saved.

The Carrel-Dakin method is most useful for the treatment of bone lesions or periarticular conditions. It is almost impossible to sterilize a severely infected joint by this method.

In the presence of a general streptococcus infection of a joint, resection gives good results, even when performed during the second or third week.

Cases with severe bone injury should be treated more often than they are by an immediate primary resection of the joint at the clearing station.

The Treatment of Infected, Suppurating War Wounds. RUTHERFORD MORRISON. The International Journal of Surgery, February, 1918.

The principle which underlies Morrison's method of treating war wounds is to get to the bottom of the wound so that it can be thoroughly cleansed mechanically, after which suitable antiseptics can be applied. With such treatment the wound then can be sutured immediately, and with impunity, and immediate healing follows in a large percentage of the cases.

The technic is as follows: Under guidance of the eye and finger the wound is widely opened and cleansed mechanically with gauze, knife or spoon; foreign bodies are removed. After mopping with methylated spirit the wound is filled with "bipp," which is thoroughly rubbed in; the excess is removed.

This method is also applicable to fractures. The end results in a considerable proportion are even yet not sufficiently good to satisfy the most moderate surgical ambition.

Coagulen (Kocher-Fonio). H. K. BONN. The Journal of the Indiana State Medical Association, October 13, 1917.

Coagulen is a substance prepared from blood; it consists solely of blood platelets and is rich in thrombokinase, an essential and important part in the mechanism of blood coagulation.

For use the coagulen powder is dissolved in sterile normal saline solution boiled for three minutes. Fonio states it is never necessary to employ any solution stronger than 5 per cent. This preparation deteriorates when older than one day. For intravenous use the solution should be filtered and made up to a 3½ per cent. strength, the amount injected may range from 30 to 70 cc. Not more than five grains of the coagulen are to be employed at any time. (When administered orally, the preparation five to ten grains is dissolved in milk or tea.) There is no danger of embolism or thrombosis, Fonio claims, but nevertheless he cautions against its use when the patient has impaired vascular walls.

Its best indication is in local hemorrhages. Bonn discusses the many surgical situations where this preparation is especially valuable when the surgeon can apply or spray coagulen directly to the bleeding area. He outlines eight cases in which coagulen was of definite help.

Tuberculosis of the Thyroid. ROSCOE E. MOSIMAN, Surgery, Gynecology and Obstetrics, June, 1913.

Tuberculosis of the thyroid is not as uncommon as is generally supposed. Mosiman reports eight cases from the Crile Clinic. Since goiter is treated surgically it has become established that the tubercle in the thyroid is not infrequently secondary to some healed or unhealed primary focus. The tubercular process is associated with other pathology of the gland as hyperplasia, pure colloid goiter, adenomatous goiters, sarcomata or any combination of these conditions.

On the Treatment of Yaws by Salvarsan and Allied Remedies. RAOUL DE BOISSIERE, Fijii. Edinburgh Medical Journal, October, 1917.

The author concludes that it is safe to say that yaws could be completely eradicated in Fijii if each patient were to receive at least two or three injections of salvarsan.

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA & ANALGESIA

[American Journal of Anesthesia and Analgesia]

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April,

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CHANGES PRODUCED IN THE BLOOD BY NITROUS OXID-OXYGEN ANESTHESIA.*

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These experimental animals were albino rats (*Mus Norvegicus*, var. *Alba*) obtained from the Wistar Institute, litters of from three to six animals of uniform size and weight being used.

The skin of these animals is so thin and their eyes so pink that any change approaching lividity or cyanosis could be readily noticed. Changes in the appearance of the eyes were always very apparent, even before any lividity could be seen in the veins of the ears or tail.

From these families of five or six, two or three were taken as control animals, so that our tests for normals were made from animals of the same weight and feeding as the anesthetized ones.

In a previous paper by the author (*Dental Cosmos*, lviii, 881, 1915) it was reported that nitrous oxid and oxygen anesthesia in man gives rise to a decrease in the erythrocytes; thirty or forty minutes after anesthesia a tendency was noted for the count of erythrocytes to return to its normal value as determined prior to anesthesia.

In a paper before the Panama Pacific Dental Congress (*Dental Items of Interest*, xxxviii, 595, 1916), the writer described the hematological changes in rats under nitrous oxid and oxygen anesthesia. A further report of the latter research is given in the present communication; the influence of anesthesia produced by nitrous oxid and oxygen upon the degree of alkalinity of the blood has also been studied.

The carbon dioxid-carbonic acid-content of the alveolar air and of the blood in a sense controls respiration, since carbon dioxid stimulates the respiratory center. According to Haldane (*Science*, n. s. xlv, 624, 1916), under normal conditions the carbon dioxid content of the alveolar air has an almost constant value of 5.6 per cent. Carbon dioxid forms by far the greatest portion of the products of metabolism which are acid in nature. Formed in the tissues, it is absorbed by the blood plasma and carried to the alveoli of the lungs; here it is largely replaced by oxygen in the gas exchange, and the blood, as it leaves the lungs, normally contains in solution air which has a carbon dioxid content of 5.6 per cent. If the carbon dioxid content of the circulating blood and of the alveolar air becomes abnormally high, the respiratory center is subjected to an added stimulation, and causes a

deeper and more frequent respiration. As a result of this ventilation, the excess of carbon dioxid is expelled through the lungs, and the normal relations between acids and bases are restored in the blood. The hydrogenion concentration or degree of alkalinity of the blood is thereby kept approximately constant.

If, through disease or medication, acids which are not excreted through the lungs are formed and enter the blood stream, more rapid and deeper breathing may compensate their presence and maintain the normal alkalinity of the blood. Should the quantity of these non-volatile acids be such that increased respiration does not maintain the normal alkalinity of the blood, the condition known as acidosis exists, and the blood becomes neutral or even acid in reaction.

HYDROGEN-ION CONCENTRATION OF THE BLOOD.

In physical chemistry the reaction of a solution is expressed by its hydrogen-ion concentration. This term requires an explanation. Study of solutions has shown that when a compound belonging to the group of electrolytes—which includes practically all acids, bases, and salts—is dissolved in pure water, the compound undergoes electrolytic dissociation into a positively charged ions and negatively charged ions travel with the current to the negative pole and the positive pole respectively. Thus hydrochloric acid yields the positively charged hydrogen ion H^+ , and the negatively charged chlorid ion Cl^- . In fact, all acids yield the H^+ ion. On the other hand, all bases yield the negatively charged hydroxyl ion (OH^-).

When hydrogen-ions predominate in a solution, it is acid in reaction; when hydroxyl ions predominate, it is alkaline in reaction. When the hydrogen and hydroxyl ions are present in equal quantities, the solution is neutral in reaction; this condition exists in pure neutral water, which is slightly dissociated into hydrogen ions and hydroxyl ions. One liter of water at a temperature of 20° C. contains 0.0000001 (one ten-millionth) gram of hydrogen ions; using the nomenclature of standard solutions, and volumetric analysis, this represents a hydrogen-ion concentration of 0.0000001 normal, which may also be written 10^{-7} normal, or, as suggested by Sorensen (*Ergebnisse der Physiologie*, xii, 393, 1912), $pH 7$.

Since the number in the term pH is the negative exponent in the logarithmic statement of the hydrogen-ion concentration, when the number is less than 7, the solution is acid; when it is greater than 7, the solution is alkaline. Thus the hydrogen-ion concentration is $pH 6$ in a solution which has an

* Read before the American Association of Anatomists, Meeting at the University of California, San Diego, California, September 11, 1917.
Toledo, O., October 9-11, 1917.

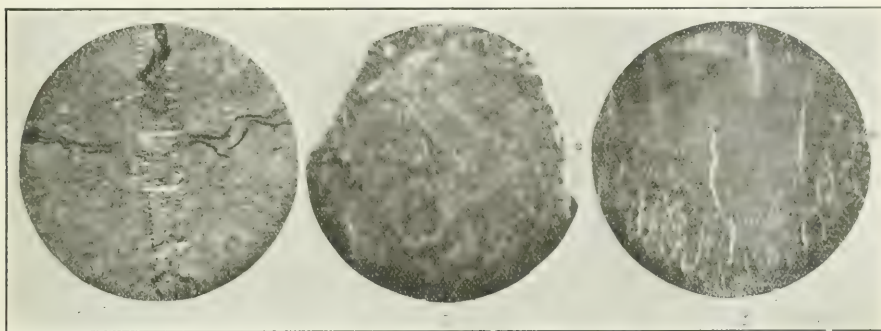
acidity 0.00000 normal, and is pH8 in a solution which has an alkalinity 0.00000001 normal.

METHODS OF DETERMINING HYDROGEN-ION CONCENTRATION.

The two more common methods for the determination of the hydrogen-ion concentration of a solution are the electrometric method, using a gas chain or hydrogen electrode, and the indicator method. In the indicator method a suitable indicator is added to the solution of unknown hydrogen-ion concentration, and to a series of standard solutions of which the hydrogen-ion concentration is known, having been ascertained by the electrometric method. By matching the color of the unknown solution against the known solutions, the hydrogen-ion concentration of the unknown solu-

reference should be made to their original report.

Marriott (*Archives of Internal Medicine*, xvii, 840, 1916), has modified this method, so that, in addition to the hydrogen-ion concentration of the blood, the alkali reserve of that fluid is also determined. The procedure is quite simple. After pH has been determined in the usual manner, a current of air is forced through the dialysate from the blood for a period of three minutes in order to expel the absorbed carbon dioxide; the dialysate is then compared with the standards of known hydrogen-ion concentration for a second time in order to determine its hydrogen-ion concentration. This residual hydrogen-ion concentration is termed RpH; the difference between RpH and pH represent the alkali reserve of the blood and also is a measure of



Figs. 1, 2, 3. Photomicrographs from sections of the spleens of normal rats. Figs. 1 and 2 from 23 and Fig. 3 from 1/6 Objective.

tion is readily determined. The chief obstacle to the application of this method to blood has been the color of the blood itself. This obstacle has been overcome in a method recently devised by Levy, Rowntree, and Marriott (*Archives of Internal Medicine*, xvi, 389, 1915), who dialyzed the blood contained in a celloidin sack against physiological salt solution, and determined the hydrogen-ion concentration in the dialysate, which is free from proteins and blood pigments, by the colorimetric method, using phenol-sulfone-phthalein as the indicator; this compound "exhibits definite variations in quality of color with very minute differences in hydrogen-ion concentration between pH 6.4 and 8.4. For standards of known hydrogen-ion concentration they use a series of solutions; each contains monopotassium phosphate and disodium phosphate mixed in definite proportions. Their procedure renders it possible to determine the figure in the pH to a tenth, and at times, by interpolation to a twentieth (0.05) of a unit. For the details of their procedure,

the carbon dioxide content of that fluid. As the alkali reserve of the blood diminishes and the condition of acidosis is approached, the numerical value of RpH becomes lower than normal.

METHOD OF EXPERIMENTAL PROCEDURE.

The animal to be anesthetized was placed on a table under a bell jar. The supply pipe for the gas was carried up through a hole in the table and allowed to enter 2½ inches above the top of the table. The exhaust tube was even with the table top, and had an elbow under the table so that escaping gas might be collected for analysis. The whole appliance was sealed by pouring melted paraffin around the edge of the bell jar, an airtight apparatus being thus secured into which the gas was readily delivered. In this chamber the animal could be kept under constant observation, and anesthesia was readily controlled, while such outside influences as fright and shock could be avoided.

Nitrous oxid and oxygen were delivered into the jar by one of the modern appliances for measuring

was resuming the normal rate. After a large amount of oxygen was given, 25 parts oxygen and 75 parts nitrous oxid, which was gradually reduced to 5 parts oxygen and 95 parts nitrous oxid. (The chamber in which the animal was anesthetized being large compared with the respiratory requirements of the animal, satisfactory anesthesia was not readily produced by immediately using the latter mixture.) All the animals were kept in a narcosed condition for at least thirty minutes. An examination of the clinical records of the animals anesthetized shows that after the first collapse many of them developed a certain amount of immunity to large doses of nitrous oxid. A careful record was made of the physical changes produced in each animal under anesthesia; respirations were counted every two minutes, sometimes with titration being needed.

erythrocytes and leucocytes and the hydrogen-ion concentration.

EXPERIMENTAL RESULTS.

The erythrocytes and the leucocytes were counted by means of a Thoma-Zeiss pipet and counting chamber, and a differential study of the leucocytes was made using a double stain of the methylene blue and eosin. The pH of the blood was determined by the method of Levy, Rowntree, and Marriott, and the R_pH by the method of Marriott. The standard solutions of known hydrogen-ion concentration were checked by means of the hydrogen electrode or gas chain.

R. O. Chisolm (*Quarterly Journal of Experimental Physiology*, iv, 207-229, 1911), made a count of the erythrocytes in 50 rats, getting an average of 8.8 millions per cubic millimeter.

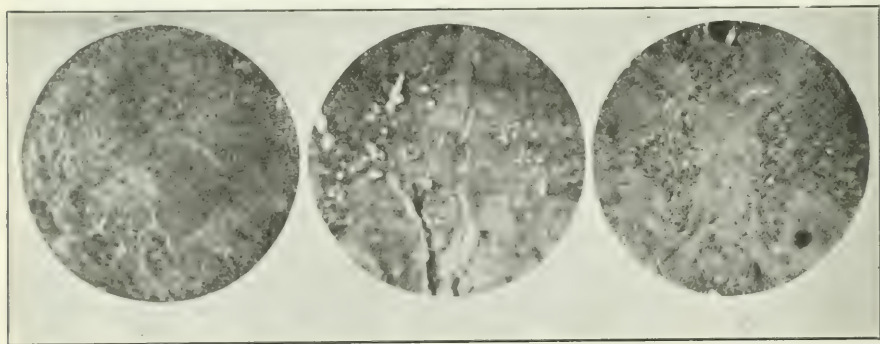


FIGURE 1. (5) Rat 22, under gas 70 minutes, the section of spleen seen to be normal in every way; (5) Rat 23, under gas for 126 minutes. Tissues normal.

and the movements of the body were observed throughout the period of narcosis. The hind legs became paralyzed first, and weakness in the back muscles were observed some time before anesthesia was produced. At this stage the animal would respond to any loud sound by pulling itself about with the fore feet, absolutely no motion being made with the hind feet. The paralysis was followed by deep anesthesia, with the respirations running from fifty to seventy-two per minute; below 50 the drop in respirations became very rapid. The animals were often restored after the respirations had dropped to 6 or 10 per minute by using a large supply of oxygen and resorting to artificial means such as compressing the abdomen and holding the animal up by the tail. After anesthesia had been continued from thirty-five minutes to one hour the animal was removed from the anesthetic chamber, killed by quick decapitation, and sufficient blood secured to make a study both of the changes in

Rivas (Quoted by Donaldson: "*The Rat.*" *Memoirs of the Wistar Institute*, No. 6, 40-41, 1915), reports a series of ten counts of erythrocytes in normal rats. The number of erythrocytes varies from 7.4 millions to 9.2 millions per cubic millimeter. He also reports a differential count of the leucocytes in the same animals.

In the present study a much greater variation was found in the erythrocytes, there being a difference of 4.8 millions per cubic millimeter between the highest and lowest counts in the 21 animals studied.

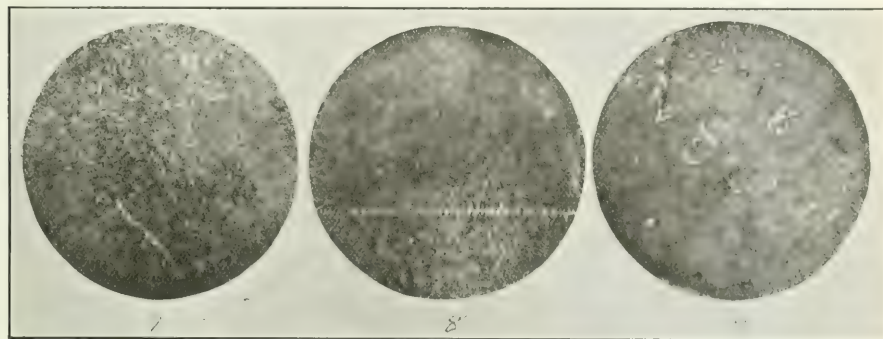
The erythrocytes were decreased in number after anesthetization with nitrous oxid and oxygen for thirty minutes to one hour, the maximum decrease in the 20 animals studied being 70 per cent., the minimum 1 per cent., with an average of 25 per cent. Macrocytes and microcytes were present in a few cases, but no poikilocytes or nucleated cells were observed. The ability of the erythrocytes to

retain their stand was also found to be slightly lessened in a few animals. The leucocytes did not show any change in actual number that was constant throughout the series of experiments, there being a decrease in number in 12 out of the 20 animals, and an increase in 8. A study of the different varieties of leucocytes, however, showed a marked tendency on the part of the polynuclear neutrophils to decrease and of the lymphocytes to increase. Of the 20 animals studied, 18 gave a decrease in polynuclear neutrophils, varying from 1 to 75 per cent., and 16 of the 20 animals gave an increase in lymphocytes varying from 5 to 23 per cent.

A study of the transitionals and eosinophiles

The average RpH was 7.95 in normal rats and 7.60 in anesthetized rats, a difference of 0.35. Marriott's figures for RpH in man are: Normal adults 8.4 to 8.55, moderate degree of acidosis 8.0 to 8.3; the difference here would be between 0.1 and 0.55.

There is no doubt that the animals in these experiments which show a pH of 6.6 or anything below pH 7 should be eliminated as no animal could live with this amount of acidosis. This reading can be explained by the method of obtaining the blood. This was as follows: the animal was decapitated and the blood drained into the cup and no doubt but that some part of the stomach contents were collected in some experiments in normal and anesthetized rats. If these are not counted an average of 7.42 pH and 8.05 RpH is obtained for



Figs. 7, 8, 9. (7) Rat 23, Malpighian corpuscles more diffuse in character; 2/3 Objective. (8) Rat 28 under the bell jar for 90 minutes. There is a decrease in the number of Malpighian corpuscles, probably also a diminution in the number of lymphocytes. This may, however, be a normal condition and not due to the narcosis. 2/3 Objective. (9) Rat 35, under gas for 34 minutes. This section shows an increase in the number of Malpighian corpuscles, but there is no evidence that this is due to the anesthesia. 2/3 Objective

showed that there was no change of special interest, the decrease and increase being about equal throughout.

A study of the segmentation of the polynuclear neutrophils also revealed little of interest, no constant change in either direction being observed.

VARIATION OF ACIDOSIS.

While both pH and RpH showed wide variations between their maximum and minimum values in both the normal and the anesthetized rats, careful scrutiny of the apparatus, the reagents, and the technic failed to reveal any reason for rejecting any of the results. Since the average value of pH is slightly less in the anesthetized rats than in the normal animals, the hydrogen-ion concentration was slightly greater in anesthesia than under normal conditions. As to RpH, it was numerically greater than 7-neutrality, in two-thirds of the normal rats, and in but one-third of the anesthetized rats, showing that the alkali reserve of the blood was depleted during anesthesia. This decrease in the alkali reserve was comparable to that of a mild acidosis in man. This does not convince us that this death is brought about by acidosis.

twelve normal rats, and an average of pH 7.21 and 7.68 RpH for the sixteen anesthetized rats.

HISTOLOGICAL EXAMINATIONS OF SPLEENS.

To determine the role of the spleen in the blood changes under anesthesia sections were properly prepared and stained with hematoxyline and photomicrographs made. Expressed in general terms it may be said that no evidence was developed from the sections examined showing any profound or even slight pathological conditions existing.

We must conclude, as far as these studies have been made, that there are no radical changes which take place in the tissue of the splenic pulps, the cells nor in the malpighian corpuscles of the spleens of those rats which were given a continuous dose of nitrous oxid-oxygen until death supervened.

In closing we wish to express our appreciation of the co-operation extended in these studies by E. I. St. John, M.D., and A. Hopewell Smith, N.R.C.S., L.R.C.P., D.D.S.

A clinical record of the experiments from which the data for this paper was secured will be sent to all those desiring reprints upon request
1831 CHESTNUT ST.

EXPERIMENTAL RESEARCHES IN THE WARMING OF NITROUS OXYGEN FOR ANESTHESIA.*

PAUL CASSIDY, D. D. S.,

CINCINNATI, O.

It is a fundamental physical law that the transformation of a solid into the liquid state, of a liquid into a gas, deprives the surrounding media of a definite number of heat units, and, hence, brings about a lowered temperature therein.

The temperature of any substance is dependent upon the mode of motion of the particles involved. The particles of a liquified substance are not able to move with the same freedom as when that same substance is in its natural, gaseous state. Hence any change from a liquid to a gas involves a greater freedom of motion of these particles, which every change in their mode of motion, in consequence, absorbs heat units from the surrounding media. We can, therefore say, in unscientific language, that cold is developed in all things immediately surrounding any substance in the process of being changed from a liquid into a gas.

To assert that liquified nitrous oxid is any exception to this rule is scientifically absurd. Any experiments that have been performed, in good faith, which seem to indicate this exception, have not been properly conducted, and are, in consequence, of no real significance.

Having been a believer in warmed vapor for anesthetic purposes for fifteen years, I have been much interested always when the assertion has been made that nitrous oxid in particular does not require warming, as, indeed, it is always of the temperature of the atmosphere by which it is surrounded. A report of five hundred cases, with the varying results obtained in the use of warmed and unwarmed nitrous oxid administered for short duration anesthesia was made by me one year ago. The statistics of one man are seldom satisfactory to others, and I expected my findings to follow this course. My deductions, however, did call forth one assertion which I have felt it was to the interest of all finally to disprove. I had said that nitrous oxid flows into the anestheticizer at a temperature of anywhere from 40° to 60° Fahrenheit scale. This was absolutely denied. To prove my deduction entirely a correct one, I decided to construct an apparatus that would permit of the accurate reading of varying temperatures within a nitrous oxid anestheticizer. The result has only confirmed me in my belief, and I sub-

mit it to you today, gentlemen, at least to indicate to you that there is a considerable danger to all patients anesthetized, for even a short time, with unwarmed, or inadequately, warmed, nitrous oxid vapor changed directly from the liquid state.

It may seem unnecessary to a majority of you that any note of warning at this late day should be uttered against the administration of unwarmed nitrous oxid. You have all of you administered this gas through heated and unheated anestheticizers. Some have continued, unthinkingly, to use the warming devices for no other reason than that it was considered the proper thing to do. Others, more observant of results, have discarded the warming attachments because the heated and the non-heated vapors apparently acted in about the same fashion. And they did, for the very simple reason that the heating devices attached to most of the anestheticizers on the market are wholly unable to raise the gases passing through them to any appreciable extent. The heating chambers are so small and the heating elements of so little power that whether they are employed or not, the gases pass through them at practically the same temperature. You, therefore, who have abandoned your warming attachments on the assumption that all warming is unnecessary, have done so upon a wrong surmise. Inadequately warmed vapor is little better for anesthetic purposes than unwarmed vapor. This fact will hardly justify, however, a refusal properly to warm the gases when this result can and should be obtained.

I have not come to you today in professional guise to cry the wares of any manufacturer of anestheticizers. I only assert that it is a fact that in few, if any, of the machines that have been presented for our use will the gases passing through them, be raised to the proper temperature for anesthesia. If it is advisable to inject liquids for regional anesthesia at a temperature approximating that of the body, it is, at least, as necessary to administer gaseous anesthetics at about the same temperature when possible. I am confident that the very reason for the considerable success of the early users of nitrous oxid, even though their equipment was otherwise to be condemned, lies in the fact that the anesthetic was delivered to the patient at about the body temperature, and with no pre-existence in the liquid state.

Properly to understand that these experiments were not conducted in a haphazard fashion, relying principally upon guess-work for results, as has been done in the past, a description of the apparatus employed will be necessary.

* Read before the 10th Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917.

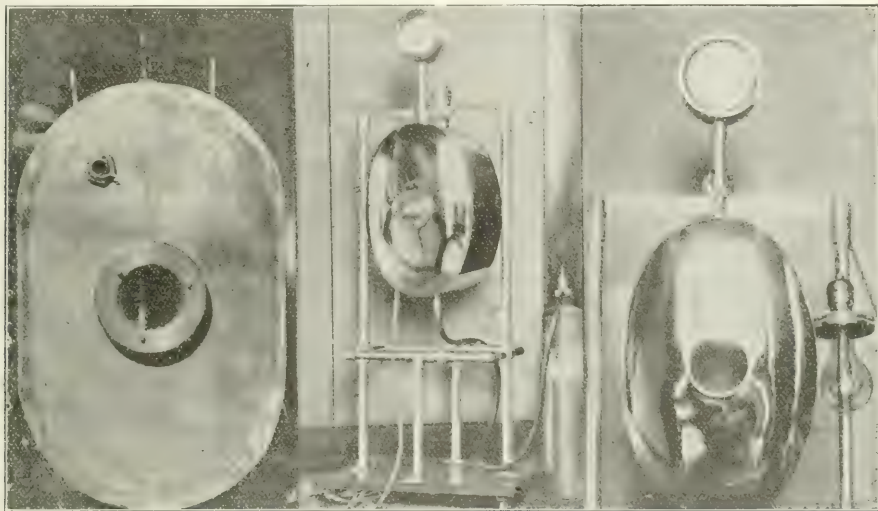
EXPERIMENTAL APPARATUS.

Recognizing that a thermometer placed at the exit of an anestheticizer could not accurately register varying temperatures; that it would be impossible to place one within a rubber bag where the differences in temperature could be read, I decided upon the construction of a metal bag, which, with a glass window through which to observe the thermometer, would permit of the immediate reading of all changes in temperature within the chamber, should any occur. This bag was built, of heavy copper plate, in elliptical form, with two flat sides. The

ring, three inches in diameter. Upon this was screwed a brass cap, in the center of which is a glass window, two inches in diameter.

Through the exit in the top was passed a registered thermometer, reading from 32° to 200° Fahrenheit scale. This was attached firmly by brass wire soldered to the top of the bag. (See illustrations.)

I trust that this description of the apparatus will at least be sufficiently comprehensive to indicate that I have spared no pains to make the results obtained certain and conclusive.



capacity of the tank is about five gallons. An eight-inch brass union, so called, is soldered into the bottom, and to this was attached the inlet tubing. At the opposite end of the bag were soldered two quarter-inch unions, one to be used for the outlet and the other as an attachment for a safety-valve of the double acting type. From one flat side there extended into the bag a copper can measuring three inches in length and the same in diameter.

Within this was placed the electric heating element, after all joints were securely soldered to prevent air leakage into the larger can. Immediately above the opening into this heating chamber was placed a brass pipe which leads to a pressure gauge, which is very delicate and was made for this purpose specially, registering, accurately, from naught, or rather from atmospheric pressure, up to an added pressure of six ounces.

Into the other flat side of the bag was a threaded

Through a rubber tube three feet in length I passed nitrous oxid from a 1,250 gallon cylinder into the unheated bag at a pressure of 2 ounces in an atmosphere of 80° temperature, and at the end of 2 minutes the registration of the thermometer had not changed. In 4 minutes, however, it had fallen 5 degrees.

Later, when the material of the apparatus had again assumed room temperature, nitrous oxid was again passed through at 2 ounces pressures for 20 minutes. When the experiment was begun the thermometer registered 81° ; at the expiration of the 20 minutes it registered 58° , a drop of 22° , or a drop of a little more than 1° a minute for the entire period.

After having turned on the electric current in the warming-chamber until the temperature stood at 130° , nitrous oxid at 2 ounces pressure was passed into the bag for 3 minutes. A drop in temperature of 1° was noted.

With the thermometer registering 130° , nitrous oxid, at a pressure of 2 ounces, was pressed into the bag for 10 minutes, and a difference in temperature of 8° , a little less than 1° a minute average, was observed.

That gases compressed greatly, but not into liquid form, assume the temperature of the surrounding atmosphere unless placed in containers of non-heat-conducting material, is a recognized physical fact. For this reason, oxygen in cylinders which have been within doors sufficiently long may be administered in very cold weather, over long periods, with impunity. This I proved by an experiment.

In an atmosphere of 76° , into the unheated apparatus was passed oxygen for 3 minutes, with no resultant change in the position of the mercury in the thermometer.

At the same pressure and room temperature oxygen was flowed into the unheated chamber for 10 minutes without any change. After having passed oxygen into the unheated bag for 25 minutes without any drop in temperature, I felt the indication conclusive.

On passing the thermeter through the apparatus when the thermometer showed a temperature of 125° for 15 minutes, a drop of 2° was shown. This resulted, I presume, from the gas passing into the chamber at a temperature of 76° , depriving its superheated surroundings of some heat units and in this manner reducing the temperature of the bag slightly.

You may note that I was much more liberal in my experiments with oxygen than in those with nitrous oxid. The former I can purchase very cheaply. Not being attached to any public institution, where experimental material seems to cost little or nothing, I cannot afford to be entirely wasteful with nitrous oxid.

CONCLUSIONS.

As a result of these experiments, I would conclude that in very warm weather, for anesthetics of no longer duration than 2 minutes, unwarmed nitrous oxid is equally as good as the heated gas; that in anesthetics lasting over 2 minutes the use of unwarmed nitrous oxid becomes progressively more dangerous with every added minute: that in an atmosphere of a temperature of not more than 70° even the 2 minute period is too lengthy. I have not been able to prove this last assertion, because of the fact that as yet I have not had an atmosphere of 70° in which to make it.

Whenever we heat gases by electric current, we do so by radiated heat. It is a fact that to heat by radiation, proportionately large surfaces coming into contact with the circulating gas or liquid, what-

ever that gas or combination of gases or liquid may be, are an essential. A gallon vessel of water placed above an open flame coming into contact with the bottom of the vessel through an opening of one-quarter of an inch in diameter would never boil, no matter what the intensity of the heat of the flame. In about the same relative proportions the anesthetic machines which have been devised for us have warming chambers, from the walls of which the flowing gases are heated by radiation, inadequately small.

My earnest plea, therefore, will be that you insist upon being provided with anesthetizers having heating chambers of a sufficient size and a heating element equal to the task of raising the temperature of nitrous oxid, as we use it, to the proper point to make its employment as wholly safe as we can wish and as its great merits as an anesthetic agent so richly deserve.

SOME SUGGESTIONS FOR THE DIETETIC, PRE-OPERATIVE AND AFTER CARE OF SURGICAL CASES.*

F. L. RICHARDSON, M.D.
BOSTON, MASS.

It seems to me that both the surgeon and the anesthetist have had their minds so carefully focused on the technical procedures of the operation and the conduct of the anesthesia that certain other factors in the care of the patient have either escaped their notice or have not received the attention that I believe they deserve. I refer particularly to the dietetic and medical preparation and after care of the patients.

It is necessary to speak of certain conditions and the factors that contribute to their production before taking up the treatment.

Let us first consider postoperative nausea and vomiting, and later postoperative gas and intestinal stasis. We will all admit that these are the things that cause the patient the most discomfort of any part of the surgical recovery. I wish also to call your attention to the effect of preparation on kidney function.

There are quite a number of factors that contribute to post operative nausea and vomiting.

- (1) The surgical condition of the patient.
- (2) Amount of intraabdominal trauma incident to the operation.
- (3) Method of induction and maintenance of the anesthesia.
- (4) Preliminary drugging.

* Read before the Fifth Annual Meeting of the American Association of Anesthetists, New York City, June 2, 1917.

(5) Duration of the anesthesia.

(6) Acidosis.

(7) Personal habits of the patient.

(1) Patients who have had intestinal obstruction almost always have nausea and vomiting following the operation even though the obstruction is relieved surgically. This is due, in part, to the surgical condition, but I believe that it is also due, in part, to the fact that they have had an insufficient amount of food. These patients cannot retain, nor is it desirable to give, food by mouth, and it is not often that one has an opportunity of giving rectal feedings before operation.

(2) Wherever it is necessary to handle the abdominal viscera to any considerable extent, especially if the handling is done roughly, we have intestinal stasis for a varying length of time following the operation. This stasis may be so marked as to be practically an obstruction and give rise both to nausea and vomiting and to the collection of gas in the intestines.

(3) The induction of anesthesia should be as rapid as is possible with safety to the patient, thus reducing the amount of saliva swallowed. Where ether is the anesthetic used this saliva contains ether in solution and this is a direct chemical irritant to the stomach. I believe that it is the absence of this factor that accounts, in part, for the smaller amount of nausea and vomiting following gas-oxygen anesthesia.

(4) Morphine preliminary to an operation quiets the nerves of a patient, reduces the time of induction and reduces the amount of anesthesia used by reducing the amount of tidal air. On the other hand it sometimes causes nausea and interferes with peristalsis. When used it is best combined with atropin, which has the advantage of reducing the amount of saliva secreted, so that less saliva is swallowed during the induction period.

(5) All inhalation anesthetics, with the possible exception of nitrous oxid, must be regarded as poisons, therefore the smaller the dose compatible with therapeutic results the better for the patient. This means the shorter the duration of the anesthesia and the lighter the anesthesia the better. Wherever there is a choice between deep anesthesia for a short period or light anesthesia for a longer period I believe that the light anesthetic is to be preferred, provided the surgeon can do his work with equally good end results. The question of whether a deep surgical anesthesia ever cuts off afferent nerve impulses is yet in dispute, there being, what seems to be, good experimental evidence on both sides. It is well recognized, clinically, that deep anesthesia in itself produces a condition

quite similar if not identical with shock. It is entirely independent of the amount of blood lost, but of course it cannot be entirely separated from the results of trauma, because deep anesthesia is never produced except in cases where the trauma of the operation makes a deep anesthesia necessary. For this condition I have suggested the term *anesthetic fatigue*. This same condition is present to a less degree in most long anesthetics with slight trauma, and it would seem as if it might be connected with the degree of saturation of the lipid bodies with the anesthetic.

(6) The question of acidosis in relation to anesthesia is one of the most obscure in the whole realm of anesthesia. It is even a question whether the name acidosis should be applied to the symptom complex as we usually see it. I hesitate to make many statements about the chemistry of this condition, yet it is necessary to say a little to give a more scientific foundation on which to base working formulae. If the present belief is true the chemical substances with which we are concerned come from the breaking down of the fats and to a lesser degree from the breaking down of proteids. We are chiefly concerned with those coming from the breaking down of the fats. Normally sugars assist in the catabolism of the fats and the concentration of the fatty acids in the blood is never excessive. Where there is deficient oxygen supply to the blood or when the amount of available sugar is remarkably reduced as in carbohydrate starvation, substances resulting from the incomplete catabolism of fats are liberated in excessive amounts and excreted in a partly broken down condition. We find them in the urine as acetone, diacetic acid, B-oxabutyric acid, etc. There is also diminished excretion of carbon dioxide by way of the expired air.

With our incomplete knowledge of the cellular metabolism, and physiology of anesthesia, it is impossible to do more than theorize about the effects of inhalation anesthetics on these complicated processes. It seems significant though that all the general anesthetics except nitrous oxid are fat solvents and are absorbed by the fats of the body in a concentration dependent on the concentration of the anesthetic in the blood and the duration of the exposure—the length of time the anesthetic has been given.

In practice the problem is usually still further complicated by a varying degree of starvation, and it is to this particular factor I wish to direct your attention.

It seems to me we are victims of tradition in this

branch of the surgical field as we have been in other branches.

When ether was first introduced it was found that patient vomited following its use. Therefore it was thought that by giving them no food or fluid they would have nothing to vomit. Quite a simple idea, but unfortunately not true. Patients go through the motions even if no food comes up. It was a great step forward when it was recognized that water either before or after the operation in itself did not cause vomiting, but on the other hand there was less severe vomiting if given. It seems to me that it is now time to recognize that food, judiciously given, does not cause vomiting, but on the other hand reduces the amount of nausea and vomiting.

Withholding food is not done entirely on account of vomiting. In abdominal operations it is not desirable to have the intestines filled, yet how often you see emergency operations on patients who have had no sort of dietetic preparation without serious embarrassment to the surgical procedure. Did you ever see serious vomiting in these cases unless there was marked sepsis or obstruction? I think that I can answer this for you in the negative. Is it not sufficient to have the stomach and colon empty if there is no gas in the small intestines? I believe this usually is sufficient.

To have the entire alimentary tract free from food means in itself intestinal stasis, with accumulation of gas from fermentation. Add to this the normal stasis following an abdominal operation and you have enough potential trouble to cause the patient considerable discomfort, and the surgeon some worry.

The question of what food to give before an operation, and how much, is in many ways more a medical than a surgical problem, and it is even a problem for the specialist in medicine. We will consider this more specifically later.

(7) Some people are easily made seasick and some are not. It seems to me that those patients who are easily made seasick in general have more postoperative nausea and vomiting, and for lack of a scientific reason for this I call it the *personal habit*.

Now let us take up the second great cause for discomfort of the patient following operation—intestinal gas and stasis.

Gas is due to fermentation and it is normally present, but the normal intestinal peristalsis prevents the accumulation at any one point and assists in its expulsion. Intestinal stasis then is the thing that makes gas a menace and the problem of gas and stasis may very properly be taken up together.

Stasis is a normal result of an abdominal operation and it has been found experimentally that, in animals, the simple opening of the abdomen without trauma, causes cessation of peristalsis for hours. If you add to this a varying amount of trauma, which is present in all abdominal operations, it may be a considerable number of hours before peristalsis is resumed. Nor are these the only factors. Solid matter in the intestines is one of the normal stimulants to peristaltic movements, yet we do our best to have the patient's intestinal tract free from this normal stimulant, sometimes even by the use of violent cathartics. Certain drugs give rise to a period of intestinal stasis, after a rather vigorous cathartic action; notable in this group is castor oil. It would seem more rational to use a saline cathartic preceded by Russian oil in the few cases requiring drugs and to make the catharsis as mild as possible. The colon, which should always be emptied before an operation, can be effectively evacuated by enemata, which does away with any interference with normal peristaltic movements of the small intestines.

Another very serious drawback to the use of cathartics the night before an operation is that the patient's sleep may be seriously interfered with, and even where there has been no interference with sleep, a patient who has been vigorously purged feels weak and played out. Who would think of giving an athlete castor oil the night before a race? Yet the patient needs his strength for the operation quite as much as the athlete for the race. There is a scientific foundation for this. Cathartics lower the blood pressure, and if you believe that the lowering of blood pressure is a measure of shock, you have produced shock by catharsis before the operation is begun.

It is not impossible that we may get some aid in dealing with the intestinal problem from changing the bacterial flora either by replanting or by feeding, or more probably by a combination of both.

The effect of ether anesthesia on the kidneys has always caused some apprehension. In this matter much blame has been laid to ether that should have been laid to other causes.

In the past operations have been undertaken on patients without symptoms of kidney disease who have not had a urinalysis and after the operation the discovery of albumin and casts in the urine has given rise to the inference that ether caused the albumin. In not a few of these cases a urinalysis before the operation would have demonstrated the presence of albumin. It is true, however, that some patients who do not have albumin before operation do have it afterwards, and it is also certain that

ether contributes to the kidney irritation. It is also true that ether is only one of the factors that may contribute to this kidney irritation. Here again faulty dietetic preparation and after care may be quite as important as ether in causing this kidney irritation, and one must not forget that the toxins from sepsis are in themselves enough in some cases to cause serious kidney disturbance.

The dietetic preparation of nephritic cases, like the preparation of patients with high blood pressure or diabetes, should be in the hands of a medical man particularly skilled in this line of work if the best results are to be obtained. I do not intend to encroach on his field. It is the preparation of the ordinary case with a view to reducing the strain on the kidneys that we should consider here.

dextrose by rectum before as well as after the operation.

Hogan in a very enlightening paper published in 1915 has called attention to the principles and theory of such preoperative care and it is only necessary to call your attention to his work. Fortunately, and as we should expect, the same dietetic preparation which gives the best results in reducing vomiting and intestinal stasis, also give the best results in conserving kidney function.

What can we hope to gain by proper attention to the dietetic preparation of the patient? We can expect to maintain the nutrition of the patient at a higher level, thus conserving his strength for the important event, and for recovery from the loss of blood and shock incident to the surgical pro-

DIETETIC PREPARATION OF PATIENTS FOR OPERATION.

Short Preparation. Operation on 3rd Day.

1	2
Abdominal Operation. Food high in carbohydrates and sugars. Low in proteids and fats. Mass small. Saline cathartic if necessary. Forced fluids.	Not Abdominal. Food high in carbohydrates and sugars. Moderate in proteids. Low in fats. Mass of any size. Cathartic not necessary except for habit. Forced fluids.

Long Preparation. Operation on 7th to 10th Day.

3	4
Abdominal Operation. Same for both up to last 48 hours. Well balanced diet somewhat high in carbohydrates. Mass large enough for regulation of bowels. Plenty of water.	Not Abdominal. Same for both up to last 48 hours. Mass large enough for regulation of bowels. Plenty of water.
For last 48° same as No. 1 except no cathartic necessary.	For last 48° same as No. 2.

I wish to hold up for special derision the ether breakfast consisting of consomme or broth, so commonly used in the past. Consider for a moment what this breakfast does and what it is expected to do. To begin with it has no nourishment. Consisting as it does almost exclusively of extractives which have to be eliminated by the kidneys, it throws a strain on organs which will be highly taxed and irritated by ether. It does not relieve the thirst because of its high salt concentration, and it does not satisfy hunger. The one useful thing that it does is to supply a little water. Better by far to give a little plain or aerated water without these extractives.

Some special conditions require quite different dietetic preparation. Take for instance a case of appendicitis that has been watched for some days and treated medically, or a gastric ulcer that has been on a greatly restricted diet. You all have seen such cases have an unexpectedly stormy convalescence, out of all proportion to the pathological process or the nature of the operation. In such cases it may not be desirable to change what the patient is getting by mouth but there is no reason why such patients should not be fed glucose or

cedure. We can expect to have less discomfort from intestinal stasis with the consequent collection of gas. We can expect to reduce the interference with kidney function.

The diet for a day or two before operation should contain plenty of carbohydrates and sugars, a moderate amount of proteid and but little fat. The mass should be small.

The accompanying chart shows the principles on which the diet should be founded.

Let us now consider the after care of our cases. Water by mouth in any reasonable quantity, preferably hot. I believe that there are no cases in which it is advisable to withhold water, although it may be necessary to restrict the quantity for a few hours. Where the patient has been on a restricted or improper diet, the addition of sodium bicarbonate or sodium citrate is beneficial and should always be given to children who seem more prone to develop acidosis than adults.

If for any reason the diet has been restricted before operation or cannot be begun reasonably soon after operation nutrient enemata of glucose or dextrose should be given, remembering that these enemata cannot be continued without an occasional cleansing enema.

Food by mouth should be started in many cases much earlier than is the custom. Some of the prepared foods consisting largely of maltose may be given quite early and although they contain relatively little nourishment because of the small quantity given, the nourishment is in such a form as to be readily available for the body needs. Milk alone does not seem to me to be a desirable form of food, though perfectly proper if mixed with thoroughly cooked gruels.

Diet is no panacea. It can not be expected to entirely eliminate all the unfortunate symptoms following anesthesia and operation. There are too many factors in their production to expect that, but it is another addition to our treatment in safeguarding the patient.

THE USE OF NITROUS OXID-OXYGEN IN LABOR.*

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The use of nitrous oxid-oxygen in obstetrics has been discussed for several years. We are now better informed as to its merits, and I feel sure that it will occupy a very important place in this branch of medical practice.

The unfortunate discussion of *Twilight Sleep* during the past few years has tended to discourage any new methods that might be devised to relieve a woman's suffering during labor.

When there is a necessity for the prolonged use of an anesthetic, nitrous oxid should be selected. I am sure there is no particular agent that would fit each and every case. In normal cases where the relief of pain is indicated, I am partial to gas-oxygen.

The introduction of anesthesia for the relief of pain incident to any operative procedure is most important. This is especially true of childbirth. Sir James Y. Simpson in 1847, speaking in defense of painless labor, said that "*pain in excess is destructive, and even ultimately fatal, and the great pain accompanying parturition is no exception to this pathological law.*"

If this be true, is it not demanded that we shall employ the best means at our command to relieve the pain of childbirth?

HISTORICAL CONSIDERATIONS.

In former years many reasons were advanced by laymen and others against the employment of such agents, and even today there are those who deny the necessity of ameliorating the pain of childbirth. But notwithstanding this, many drugs have been used for this purpose, each of which has had its supporters. The ideal agent still is unknown.

Simpson thought that the pain of parturition could be lessened by anesthesia without interfering with the natural course of labor. This he accomplished in 1847 when he was accoucheur to the first woman ever delivered under the influence of an anesthetic.

In the fall of the same year he began the use of chloroform, and from the year 1853, when it was administered to the queen of England, the use of chloroform stood out supreme.

During the same year Dubois of Paris, and Morton and Keep in Boston employed the inhalations of ether during labor. Pajot in 1854 wrote of the advantages of chloroform inhalations for the relief of pain. Then in 1878 Pinard wrote an elaborate monograph entitled "The Comparative Action of Chloroform, Chloral, Opium and Morphin on Women in Labor." This was a masterpiece of the early writers, and many of his deductions remain unchallenged.

He demonstrated that chloral was absolutely of no value, and that morphin was only an adjunct of other drugs.

It then remained for Paul Bert in 1878 to suggest that nitrous oxid combined with oxygen was the ideal anesthetic in labor, and in 1880 Klikowitch of Petrograd demonstrated its efficiency in the pain incident to labor.

In Edgar's edition of Winckle in 1890 we find some observations which foreshadow our own of today.

UNSATISFACTORY REPORTS.

The unsatisfactory reports that were heralded as a *knock-out blow* to nitrous oxid probably were due to the lack of development of a proper apparatus. My own experience in over one hundred cases has yet to cause me the least bit of alarm, and I can add that reports from other obstetricians are practically the same.

The period of application varies from a few minutes to hours. Our best results have been obtained where the gas has been given *skilfully*. It has been proven beyond any reasonable doubt that when the proper care has been exercised we notice no ill effect either to mother or babe.

*Presented at the Twenty-Ninth Annual Meeting of the American Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, Ohio, September 1917.

SYSTEMIC EFFECTS.

The effect of gas upon the system varies with the amount given. Circulation and respiration are but little disturbed and the blood pressure is but slightly increased. Quite recently I have seen it act as an *antispasmodic* in a very nervous primipara. The cases where we have an increase in the cardiovascular function are those in which a great deal of gas has been given.

During the past two years wonderful strides have been made in the practical use of analgesia. In the production of analgesia (a phase in which we are most interested), one sees little out of the ordinary. The rule is a normal pulse rate and respiration.

ANALGESIA.

What do we mean by analgesia? It is the loss of the sense of pain perception without the loss of the sense of touch or general consciousness. It is brought about by the depression of the centers of the pain perception; its intensity depends largely upon the size of the dose administered.

Nitrous oxid is an ideal agent for this effect. Patients may still retain their mental faculties during analgesia, and it is very rarely necessary to administer gas until there is complete inhibition of the pain centers.

The mucous membrane is very slightly congested under a prolonged application of gas oxygen, the gastro-intestinal disturbances are uncommon, slight vomiting and a mild distension being the only symptoms of any import.

Gas-oxygen is applicable in delivery because we have all the normal functions of both the voluntary and involuntary muscles undisturbed. This condition wards off postpartum hemorrhage. The picture is quite different when chloroform or ether is used.

When nitrous oxid is properly administered the patient shows very little exhaustion, the postpartum condition is most favorable, and everything points to a speedy convalescent. During the administration of gas the foetal heart should be listened for, every half hour. I think it is well to have the patient very quiet, partake of little food, and drink little.

ADVANTAGES.

The advantages of nitrous oxid over the so-called *Twilight Sleep* are:

1. A shorter second stage; the patient using all her voluntary efforts to expel the babe.
2. A very even relaxation of the muscles; minimizing the dangers to perineal tears.
3. A total absence of restlessness and rigidity, which bring about lacerations.

4. The rapid return to normal after the mask has been removed.

After careful study I offer five reasons why gas-oxygen is the most valuable analgesic in obstetrics:

1. Practically the whole second stage is painless.
2. There is an absence of exhaustion.
3. There is a diminution in postpartum psychoses.
4. There are fewer lacerated perineums.
5. Better babies.

Experiments have shown where the mother is healthy there can be no disturbance to the secretion of her milk. The baby is absolutely normal if all other things are equal.

Convalescence, where there has been a long hard labor, is usually rapid. This of course depends entirely upon the nature of the delivery. Involution is completed as usual and the patient requires very little care.

RESULTS IN DIFFERENT PATIENTS.

The patient usually takes gas very readily, and with each uterine contraction there are all the evidences of normal labor, the head is pushed farther and farther down and is finally born without the semblance of pain. It is true that some patients claim more relief than others, multiparae being better satisfied because they have had their experiences under the old method of terminating labor. The ordinary multipara will tell you there is no comparison in the treatments. Other things being equal I think it will be agreed that we are warranted in doing everything in our power to please the patient.

It is very poor policy to demand early narcosis; it is much better to explain to your patient what analgesia means. Very few patients fail to respond, and in my experience I recall but one. If we should base our opinion upon postpartum discussion there would be a high rate of satisfied mothers.

I think that we all agree that pain is greatly reduced but not entirely absent. We must study each individual case, watching the expression of the mother, and also noticing the movements of her extremities. I have known women to cry out and groan, but later say: "*It did not hurt. I was only afraid that it would.*"

Many errors in the end-results, with gas-oxygen analgesia, come from an unskilled application. The gas should be administered in small doses, gradually leading up to a point where the patient becomes satisfied. With this accomplished, you will have her co-operation.

EFFECTS ON THE BABE.

Nitrous oxid has no ill effect either directly or indirectly upon the babe. It has been proven that it is not transmitted to the babe in utero.

The administration of nitrous oxid should begin at the first sign of pain, and the mother should receive the most gas at the height of each contraction. At this time a great deal of gas is entering the blood, the uterus being in a state of high contraction with very little interchange of maternal and faecal blood. During the period of relaxation there may be a slight interchange of blood, the blood of the fetus receives very little nitrous oxid, and by the time relaxation is complete the mother's blood becomes well oxygenated.

In producing analgesia the dose is so small that it would be quite harmless if given directly to the infant.

We have had very little need for artificial respiration; the majority of the babes cry out immediately after delivery.

TIME AND DURATION OF APPLICATION.

The time of application varies greatly, each practitioner having his own idea. Gas-oxygen may be given for many hours without any ill effect. Our longest period was between three and four hours and we noticed little change in the patient's physical or mental condition. Where the mother has suffered for several hours before the administration we find evidence of exhaustion and sometimes syncope. When used late, especially in the class of *highly neurotic* patients, our end-results are not so satisfactory. It is much better to begin early. It may require a little more time, but in the end one is quite sure to be better pleased.

EFFECTS ON PROGRESS OF LABOR.

Gas controls the progress of labor in a way peculiar to itself. That the second stage of labor is shortened, there can be no doubt. I am positive that its effect upon the first stage is nil. Do not expect to have a quiet patient when gas is administered late.

When given for its analgesic properties it relaxes the muscular fibers to a degree comparable to normal sleep.

Labor pains do not require as much as would be deemed necessary for surgical interference. Analgesia depends entirely upon the amount of gas absorbed. In the average case our mixture approximates 90 per cent. gas and 10 per cent. oxygen.

The nerve centers presiding over the five physical senses are affected one at a time in recognized and constant sequence. The sense of touch or feeling is the first to disappear and the sense of hearing is the last. A state of analgesia commences with the suppression of the nerve centers affecting feeling and continues progressively until the last and most acute sense has been suppressed, when anes-

thesia has been induced. The patient remains susceptible to suggestions long after the sense of touch has been put out of commission. Because of this, the patient will carry out her part of the program more satisfactorily at any time after analgesia is well established.

Our best results are with women of natural intelligence, not necessarily highly educated, but with good, sound, common sense. Those who give us the most trouble and who fail to carry out their part of the plan are the mentally indolent class or those with sluggish minds. A highly nervous and irritable woman may trouble you at the start but after she has become acquainted with the surroundings you may be able to induce a fair degree of analgesia.

With a primipara the practitioner meets with an occasional disappointment, simply because she never has suffered the pains of a previous labor. Some excellent results have been derived after the patient has been in labor for a while, where one can implant an idea of the advantages that are derived from the administration of nitrous oxid. Occasionally you will meet with one of those lazy, indolent multipara with a large rectocele and cystocele who will not give you any help whatever.

First deliveries under any ordinary system are considered nerve wracking. Our most satisfactory results, of course, are obtained with the multipara, for after having suffered in previous labors they are very grateful to their attendant for having reduced their suffering to a minimum.

ALKALOIDAL ADJUVANTS.

The use of the different therapeutic agents in connection with gas oxygen is a theme of great interest. I formerly used a method employed at Freiburg with indifferent results.

Morphin if given quite early will act as a sedative during the *first* stage, but when given late in this stage or early in the *second*, it is apt to do irreparable damage to the babe. It should be given at least six hours before the delivery; if given too late the babe is apt to be born with its respiratory centers so blasted that it is very difficult to resuscitate. I have seen several cases of asphyxia livida, which I am sure were the result of the late introduction of the opiate.

Morphin depresses the sensory centers and sometimes causes an unnecessary delay in the beginning of the case. If given in large doses like 1-4 gr., the mentality of the patient is sometimes impaired. This is a condition that we try to avoid. When the pains are severe I prefer to depend upon the gas itself.

It is true that in highly nervous women where pituitrin has been used to decrease the frequency of the contractions, morphin and pantopon can be used with some degree of success.

RELAXATIONS OF THE PERINEUM AND LACERATIONS.

We have had very few cases of perineal lacerations where analgesia or anesthesia has been in-



Fig. 1—Patient being placed on table for delivery.

Fig. 2—Patient signaling with her hand for gas-oxygen in advance of pain.

Fig. 3—Rupturing the membranes.

Fig. 4—Author's method of stretching the perineum and supporting it to prevent lacerations.

Fig. 5—Child being born, pink, and crying lustily immediately.

Fig. 6—Patient after childbirth, smiling and happy, and receiving congratulations of attendants.

When no anesthetic is used, especially in a primipara, the mother more or less loses control when the head is coming through. If we are able to lessen her suffering, relaxation comes almost involuntarily. She will throw into activity all of her expulsive power and the operator then can have control over his patient, and with the proper precautions will be able to deliver her without a tear.

Under gas analgesia the perineum becomes relaxed. The advancement of the head in the second stage will probably be hastened by the patient's own efforts or by the use of pituitrin, or both. One can then manipulate the perineum and hold the head back at will with the patient perfectly quiet and without the least semblance of restlessness.

When *continuous analgesia* does not relieve the patient of her restlessness and nervousness at the time the head is on the perineum, we usually resort to a slight narcosis. Of course, analgesia controls the patient better than narcosis. This is especially true where it is just sufficient to relieve the pain. Our experience has taught us that on the whole it is more satisfactory where we have had a continuous analgesia for one-half to one hour before delivery.

FORCEPS AND ETHER.

If the use of forceps is necessary, when one wishes complete relaxation, I do not mind the administration of a small amount of ether. I never yet have seen any bad results come from it. I would much rather deliver with the forceps a patient under ether than to do some operation about the soft parts, for the release of the head.

Analgesia affords no protection against laceration to the cervix or vaginal walls. This is especially true when we have to deal with uterine inertia in one of those lazy multiparae where one has to give pituitrin.

To recapitulate: when the forceps are used and where there is a small vaginal orifice and a rigid perineum it has been our practice to administer some ether, along with the nitrous oxid-oxygen, because ether contributes a greater relaxation of the muscles and delays the advancement of the head.

PROBLEMS OF INFILTRATION

As to the use of local anesthesia I have little to say. I have used novocain hypodermically into the perineum with very little result. It must be injected at the proper time and where the head is low we oftentimes find it necessary to reinfiltrate.

This situation demands a technic a little worrisome when we do not know exactly how much of the drug has been absorbed.

Infiltration must be employed before the perine-

cum becomes distended. Of course novocain can have no effect upon the infant. Unfortunately for this drug it is not safe to use where there is a tardy descent of the head, and these are the cases in which it should be used.

With small vaginal outlets and a rigid perineum there is nothing that so quickly relieves the pain as the gas-oxygen analgesia.

COMBINED ANESTHESIA FOR REPAIRS.

With regard to all obstetrical operations, like perineal repair, it is advisable to give ether with the nitrous oxid to the point of narcosis. There are minor repairs like lacerations of the first degree that can be repaired under gas. When analgesia is used for such repairs it is always best to induce it to a degree, bordering on complete anesthesia.

When one is practicing obstetrics exclusively, he must accept cases as they come. It is not always possible to determine the status beforehand and therefore we must be on the lookout for all sorts of things.

I recognize that some obstetricians have to face the problem of self-administration of gas. With this I have had no experience. Our work is so situated that the services of an expert anesthetist are at all times available. With self-administration I should say that intermittent narcosis is safe because when the patient once becomes anoxicemic she usually drops the cone. Another possible advantage of self-administration is that it gives the mother something to do and probably strengthens her will for terminating the labor, but on the whole it is an unsatisfactory method, particularly in dealing with primiparae.

Continuous analgesia is sometimes necessary in order to secure best results. When the contractions become rapid and the pain very severe, continuous analgesia is indicated. It affords greater relief to the mother and she can be controlled more easily. Continuous narcosis is only demanded where an obstetrical operation becomes a necessity. Once in a while it becomes useful in quieting a high-strung, nervous patient.

FATALITIES UNDER NITROUS OXID.

To touch on deaths under nitrous oxid is to open one of the moot questions of anesthesia. After careful consideration I am prepared to say death under nitrous oxid almost invariably results from asphyxia and asphyxia need not result when gas is administered by a competent anesthetist. Even in cases of cardiovascular diseases I think it is agreed among surgeons that nitrous oxid is less dangerous than any other anesthetic. Where we have this condition to deal with in labor and where it becomes necessary to resort to anesthesia it is the part of wisdom to end labor as quickly as possible and in as easy a manner as possible. Blood pressure changes very little during analgesia, probably only from five to ten millimeters. It mounts very rapidly with the occurrence of cyanosis. Herein is the danger with a degenerated myocardium which renders the patient liable to apoplexy or acute dilatation of the heart. In such cases it behooves the operator to stay away from the asphyxial stage.

SACRAL ANESTHESIA.*

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In 1913, we first published the results of our trial, in some twenty cases of sacral anesthesia. At the time we were ignorant of the fact that Cathelin, Stoeckel, Loewen, and others had been employing this method with marked success.

We first adopted this form of anesthesia in our search for one other than hypodural, to prevent shock in the combined operation for cancer, where the upper rectum and sigmoid were involved.

Satisfied with our results, we extended the scope of this procedure to embrace operations on the perineum for hemorrhoids and other conditions, finding that a minimum of discomfort and danger followed.

Considering that sacral anesthesia enjoys safety, increases efficiency, and produces few after complications, it is surprising how seldom it is employed.

One frequently reads of the employment of hypodural anesthesia for hemorrhoids. We took exception to this many years ago, as being fraught with danger that was out of the proportion to the gravity of the operation. We, in our turn, were taken to task by men employing the hypodural method, claiming that their way was quite as safe as any other form; but I notice that the men then loudest in their praise of this procedure are no longer using it. More than one of our colleagues who were very keen on spinal anesthesia, has now abandoned it, realizing its grave dangers.

I do not wish to convey the impression that I am comparing the usefulness of hypodural with extradural anesthesia. That is far from my purpose. Both have their field of usefulness. But, within its special scope, there is no comparison from the standpoint of safety between hypodural and extradural anesthesia. Nor do I wish to be understood to be advocating sacral to the exclusion of local or general anesthesia. There are indications for each, and the surgeon of experience will instinctively select the proper one.

Sacral anesthesia consists of the injection of an anesthetizing solution such as novocain or cocain into the intradural space through the sacral canal. It is purely a conductive anesthesia, by which more or less extensive complex of sensory nerves are interrupted. It will act upon

the spinal nerves after they have left the dural and so block all sensory impulses. Cathelin, the great French surgeon, was the first to demonstrate the possibilities of this method. He injected three cc. of a 1 per cent solution of cocain into the sacral canal of a dog, resulting in a complete anesthesia of the whole body.

Encouraged by this experimental work on animals, he applied the same procedure to man, meeting with disappointing result, the experiment being a total failure. However, he was not discouraged. He continued his efforts, confined himself to various neuropathologies, such as pelvic neurosis, neuralgias and incontinence of urine, and in over a thousand cases obtained good results. Stoeckel, learning of Cathelin's work, immediately perceived its value in obstetrics. He modified Cathelin's technic somewhat and succeeded beyond his expectations in reducing the pain of labor and also found it helpful in relaxing the perineum in elderly primipara.

Loewen, in 1910, followed Stoeckel; then came Schlimpert, Schneider, Koenig. Each added his quota in exploring and developing this field. They believed that its usefulness could be extended by increasing the amount of the solution and adding adrenalin and bicarbonate of soda and also by using a much longer needle. By these methods and by the addition of narcotics, they were able to perform abdominal operations. This they termed high extradural anesthesia. It would seem as though they had gone a bit beyond the legitimate field and that it would be much better to adopt some other form of anesthesia in laparotomy. We further believe that by developing the legitimate field of sacral anesthesia, great things can be accomplished. Wilms recommends the injection of 20 cc. of saline, before injecting the novocain; and believes that by following this method, the novocain absorption is limited, and better local anesthesia is obtained. Strauss suggested the addition of sodium sulphate, to prevent the decomposition of adrenalin.

ANATOMICAL CONSIDERATIONS.

There are a few anatomical features worth considering. *First*, the conformation of the sacral canal and the posterior surface of the sacrum. *Second*, the gross anatomy of the lower spinal cord and sacral roots.

The Sacrum.—The posterior surface is composed of the fused laminæ and their modifications. The upper borders of the first laminæ slant downward, and below their junction is a well-marked spine. Below this the laminæ of the sacral vertebrae are fused and the spines small. The lam-

* Read during the Fifth Annual Meeting of the American Association of Anesthetists, New York City, June 2, 1917.

inae of the fifth sacral *nerve* join, and those of the fourth frequently do not. This is the important point, for thus it leaves the lower end of the canal uncovered. This is the sacral hiatus, and the place through which we inject the anesthetic.

The laminae that do not meet end in tubercles, each representing, of course, one-half of a spinal process. The lower two project downward at the sides of the open canal, and are called the sacral cornua. Right below this, in the median line, is the base of the foramen, and oftentimes a bony knuckle, the sacral coccygeal junction or articulation.

The Sacral Nerves.—The spinal cord terminates as such in a pointed end—the *conus medullaris* that usually ends opposite the discs between the first and second lumbar vertebrae. The *dura mater* of the cord, however, continues and extends to the level of the second sacral vertebrae. From the third lumbar vertebrae down the lumbar and sacral nerves pierce the dural sheath till they reach their individual foramina and leave. These nerves run a varying distance through the canal—depending upon their destination; they are supported by a loose cellular tissue and are enveloped posteriorly by a thin diffuse anastomosing venous pampiniform plexus.

EXTENT OF ANESTHESIA.

A consideration of the nerves affected and the regions supplied, shows that the conduction of the ano-coccygeal root nerves, the fifth, fourth, third and second sacral nerves, are affected. These nerves cover an extensive area and form many large plexuses and complexes and nerve centers which are in close harmony with the ever-present great sympathetic. The upper extent of anesthesia and nerve blocking depends purely upon three factors, (1) amount and concentration of the solution, (2) posture, and (3) disposition of the anesthetic. If the patient's pelvis is raised, if a very potent amount of solution be injected, and if the needle be inserted very high, it is possible by the sacral route to anesthetize even the fourth and fifth nerves.

In the low extradural anesthesia—the ordinary type—the nerves affected are the coccygeal nerves and the nerves derived from the coccygeal plexus, namely, the pudic, the inferior hemorrhoidal and the perineal and the dorsalis penis, or clitoris. In addition, the visceral branches of the third and fourth sacral nerves which are distributed as the middle hemorrhoidal, the inferior vesicle and vaginal nerves to the rectum, bladder and vagina, respectively, are also interrupted.

Sometimes the external and internal popliteal are touched by the anesthetic, leading to parasthesias and hypesthesias of the legs and feet, and the small sciatic. These are purely accidental. The pudendal plexus is affected the most. It is formed by contribution from the first, second and third sacral nerves, and from the entire anterior primary division from the coccygeal nerve.

As a rule, isolated nerve trunks are also affected, and it was this phenomenon that caused Stoeckel to apply it in obstetrics. He called attention to the flaccid floor of the pelvis after extradural anesthesia. The relaxation of the sphincter, and is particularly useful in some surgical operations.

With the nerve distribution in mind, it can readily be seen that with perfect anesthesia any pelvic, perineal, rectal or bladder operation could easily be done.

The method we follow has been developed within the last four years by ourselves and by those we have mentioned.

TECHNIC.

We find it best to employ a glass syringe which holds about 20 cc. and which fits comfortably into the needle such as is generally used in hypodural anesthesia. One of our assistants had a serious accident when introducing the needle, about three centimeters of the end of the needle remaining in the canal after the needle was withdrawn. Since then we have employed a platinum needle. When we speak of a needle, we mean a very fine trocar and canula, like that used in spinal anesthesia. After the trocar is removed, the canular can be passed through the canal without injuring the veins, which lie in the loose tissue within the canal. Furthermore, there is less danger of penetrating the dura, as happened to us on two occasions by using the needle we have just described. Some of our European colleagues introduce the needle when the patient is in a sitting posture. We prefer the left Sim's position.

ANATOMICAL LANDMARKS.

We have examined a number of cadavers, and taken measurements at different points, to establish, if possible, a fairly accurate method by which the opening of the canal can be located. At first measurements were taken from the posterior superior spine of the ilium to the tuberosity of the ischium on both sides, but the bi-section of these lines did not come anywhere near the opening. The next measurements were taken from the posterior superior spine of the ilium to the left margin of the sacrococcygeal joint, and the same on

the other side, and we found the opening of the canal in the majority of the cases, to be where these two lines bisect. Here inject one or two cc. more, and this is made much simpler if the needle has been left in place.

PRECAUTIONS.

It is important for the fluid to be absolutely sterile and freshly prepared; also of the same specific gravity as the blood, in order that it may be readily absorbed.

After anesthesia is established the needle is withdrawn, and some cotton and collodion placed over the wound. The patient is then placed in whatever position is desirable in order to perform the operation, and the rest of the procedure depends upon what particular operation has been undertaken. If a prolonged anesthesia is necessary, urea and quinine may be substituted for cocaine. I have not as yet determined how much urea and quinine is necessary in order to produce complete anesthesia, or what would be the duration of the anesthesia under this procedure. I shall work this out later on.

EXPERIENCES.

We have used this method of anesthesia in eighty different cases, and in all but sixteen cases the anesthesia was perfect and all that could be desired. One case in particular was very interesting. The patient was a young man, twenty-three years of age, with a carcinoma involving the prostate and rectum. We were able to dissect the rectum and remove the prostate with absolutely no pain. However, when the dissection was almost completed and we were ready to separate the rectum from the peritoneum we encountered some pain and pronounced shock when pulling on the rectum. He also had severe pain when an attempt was made to cut the peritoneum with the scissors. Before proceeding further we had to give the patient a general anesthetic in order to complete the operation.

From this case we learned the lesson that operations involving the peritoneal reflexion are impossible with sacral anesthesia. If I had used my usual procedure of blocking the hypogastric ganglia above I could have completed the operation without further pain. The shock which occurred when I pulled on the peritoneal reflexion was due to pulling on the lumbar and inferior mesenteric plexus of the sympathetic, and to the fact that we had not blocked this point.

The other cases were operations involving the rectum only, and all were accomplished with the greatest ease to the operator and comfort to the

patient. In no instance did we use more than 10 grains of novocain, and that amount was used in the operation which involved the removal of the rectum and the prostate. The point of interest in connection with this case is worth mentioning. Before dissecting the rectum free from the urethra and removing the prostate, one of my assistants tried to pass a sound into the bladder. Some difficulty was experienced on account of a posterior stricture. After gentle manipulation we succeeded in passing the sound into the bladder, and during all of this procedure the patient had not the slightest sensation of pain or discomfort.

SPECIAL UTILITY.

The value of this method, therefore, in cases of stricture of the urethra in hypersensitive individuals in whom it is necessary to explore the urethra or the bladder can easily be understood. Especially will it be found serviceable in old men on whom it is necessary to do a prostatectomy, or in any procedure involving the urethra or bladder. It finds its greatest field of usefulness in cancer involving the rectum and sigmoid, because here we can completely block the sympathetic by a combination of hypogastric and sacral anesthesia. In protracted and intractable pruritis great relief can be obtained by this method of anesthesia.

CONCLUSION.

In conclusion, we would ask that this comparatively old, but seldom used, method of anesthesia be given a more extended trial in suitable cases, so that the limits of its usefulness can be determined.

THE AMERICAN ASSOCIATION OF ANESTHETISTS WILL MEET IN CHICAGO JUNE 9-10, ON THE EVENINGS OF THE CLINIC DAYS OF THE AMERICAN MEDICAL ASSOCIATION. OWING TO THE UNTIMELY DEATH OF DR. F. W. NAGLE, PRESIDENT, DR. ALBERT H. MILLER, OF PROVIDENCE, R. I., WILL ASSUME THE DUTIES OF ACTING PRESIDENT, AND ON ACCOUNT OF CAPT. J. T. GWATHMEY'S ABSENCE ON SERVICE IN FRANCE THE EDITOR OF THE SUPPLEMENT HAS TAKEN OVER HIS SECRETARIAL RESPONSIBILITIES.

AN INTERESTING AND INSTRUCTIVE SCIENTIFIC PROGRAM IS BEING ARRANGED. DURING THE CLINIC DAYS CHICAGO ANESTHETISTS WILL DEMONSTRATE MANY OF THE ROUTINE AS WELL AS THE NEWER METHODS OF ANESTHESIA AND ANALGESIA. AN ADDED ATTRACTION WILL BE A SYMPOSIUM ON SHOCK BEFORE A JOINT SESSION OF THE SECTIONS ON SURGERY AND PHYSIOLOGY AND PATHOLOGY. IT WILL REPAY YOU TO ATTEND.

REFORMING THE SURGEON.*

CHARLES H. GALLAGHER,

ITHACA, N. Y.

One of the most astonishing things I know is the capacity of the *average* surgeon to resist the advance of the art of anesthesia. In the hands of a large and ever-increasing number of men this art has attained the dignity and shouldered the responsibilities of a full-fledged specialty.

Improvements in anesthesia have done more than any other thing to lessen surgical mortality since the discovery of asepsis. The surgeon has too willingly accepted the blame for anesthesia faults and failures, masquerading under the name of surgical shock, and it is not to his credit that he has failed to put the blame where it belongs.

The duties of the anesthetist should begin as soon as the operation is decided upon. The actual administration of the anesthetic is not the most important of these duties.

Up-to-date anesthesia produces results far better than the old methods. Everyone present knows this to be true, but it seems to be still necessary to convince the average surgeon of this fact. I agree with Dr. Albert Miller that a uniform system of records, adopted by this Association, and the results of a very large number of anesthetics tabulated under a standardized form, would be the best way to educate some surgeons as to the better results of modern anesthesia of which he may and should avail himself. These records should consist of three parts.

The *first*, filled out before the patient is brought to the operating room, should contain all the facts relating to the physical, functional and mental condition of the patient and the operative procedure to be undertaken, from which the skilled anesthetist will be enabled to decide as to the best pre-anesthetic preparation and medication, and the best anesthetic drug to be used and the method of its administration.

The *second* part of this record, filled out in the operating room, should cover all the details of the administration of the anesthetic, including such details of operative procedure as have a direct bearing on the anesthetic and post-anesthetic conditions, as hemorrhage, traumatism and handling of certain organs.

The *third* part, filled out after the operation, should contain the proof we are after—that *we can furnish the surgeon better results, better recov-*

eries, less nausea, nephritis, pneumonia, hepatic necrosis, uremia, with expert anesthesia.

Remember always that there may be causes not connected with the anesthesia for untoward conditions, and accurate observations and notes before and during the operation may determine causes for which the anesthetist is not to be blamed.

The great advance in the methods of administering anesthetics in the last few years has been largely due to improvements in the mechanical apparatus used for controlling, mixing, and administering the various anesthetic agents.

The selection, proper care, use of this apparatus places the anesthesia still farther from the control of the surgeon and puts more responsibility upon the anesthetist.

The various systems of anesthesia now in use and producing the best results require such careful control and adjustment of the gases or vapors used and the effects are so quickly noted and changes so quickly made that no one but the anesthetist is or can be in close enough touch with the signs to judge what changes are necessary, and when.

It is plain that the surgeon is here accepting the responsibility for something that is beyond his control.

To secure the best results there can be no predetermined amounts or percentages of any anesthetic drug or mixture or time of the different stages of an anesthesia, for, after all, the scientists and inventors are through, the patient is the final and only gauge of the proper amount and proportions of any anesthetic or anesthetic mixture. This point should be considered in the selection of apparatus. Induction is as important as any other step, and here again the anesthetist should not have any predetermined figures set for him. Each case makes its own rules. Smoothness is worth more than speed.

The most rapidly eliminated anesthetic causes the fewest after results and requires the most care in administration.

While convincing the surgeon that the new anesthesia offers many advantages over the old, he will gradually arrive at the conclusion that anesthesia has become a subject so broad and deep that it is absurd to think that its selection, preparation, conduct, and after care, can be directed by anyone who is not specially trained for the work, and who cannot give his undivided attention to the details of the anesthetic phenomena.

Some recent court rulings tell us that the surgeon is in full charge of the anesthesia and the responsibility connected therewith is wholly his. Possibly the surgeon has no recourse but to accept this

state of affairs to a certain extent on account of the limited number of qualified professional anesthetists, but the time will come when he will wish to avail himself of the newer and better forms of anesthesia, and he will then realize that he is as unqualified to decide and direct the various steps of a proper anesthesia as he is to issue orders to his roentgenologist, or his oculist, or his laboratory expert, as to the methods which they shall use to produce the desired results.

Even beyond this lies a further lesson and opportunity for the surgeon. A prominent member of the profession has said that he can spoil the best anesthesia given by his conduct at the site of the operation. It is true.

A surgeon whose technic is such that his patients have to be given a larger dose of the anesthetic drug than would be required with a technic modified in certain particulars, and producing equally good results, should be willing to so modify his technic that a minimum amount of anesthetic could be used, thereby lessening in a direct ratio all the dangers and discomforts of anesthesia.

This course would redound directly to the benefit of the surgeon and the patient.

A thorough co-operation between the surgeon and the anesthetist is absolutely necessary to the working out of the proper technic required to enable the surgeon to avail himself, for the benefit of his patient, of the very best results in anesthesia.

I wish here to make an earnest plea for this co-operation which means so much for both the anesthetist and the surgeon, and to assure the surgeon that he will then receive a most gratifying measure of appreciation from both the anesthetist and the patient.

145 COLLEGE AVENUE.

THE INTERSTATE ASSOCIATION OF ANESTHETISTS WILL MEET IN INDIANAPOLIS, IND., SEPTEMBER 25-27, IN CONJUNCTION WITH THE INDIANA STATE MEDICAL ASSOCIATION. THIS WILL BE ONE OF THE MOST INTERESTING AND ENJOYABLE MEDICAL MEETINGS IN THE MIDDLE WEST THIS YEAR, AND ALL THOSE WHO ARE INTERESTED IN ADVANCING THE ART OF ANESTHESIA AND CONSERVING THE STATUS OF THE ANESTHETIST, ARE CORDIALLY INVITED TO ATTEND.

ONE OF THE FEATURES OF THIS MEETING WILL BE A JOINT-SESSION OF THE TWO ASSOCIATIONS DURING WHICH A NUMBER OF PAPERS ON ANESTHESIA, AS IT IS OF INTEREST TO THE SURGEON AND INTERNIST, WILL BE PRESENTED.

AS USUAL, THE LADIES IN ATTENDANCE WILL BE DELIGHTFULLY ENTERTAINED.

ANESTHESIA AT THE FRONT

Continuing the Department of Anesthesia at the Front, the Editor of the SUPPLEMENT presents additional data collated from authoritative sources that will be of interest to those making a study of Anesthesia in War Surgery.

ANESTHETICS AT A CASUALTY CLEARING STATION.*

GEOFFREY MARSHALL, Captain R. A. M. C., S. R.

Surgical operations performed at a Clearing Station are for the most part urgent. It is often imperative to operate on men within a few hours of their injury while they are still suffering from the effects of shock and hemorrhage. The patients have had to travel some miles from the line by motor ambulance over different roads, and many have been exposed to cold and wet. A correct choice of anesthetic is of the first importance: the patient's life will be as much imperiled by faulty judgment on the part of the anesthetist as by a wrong decision on the part of the surgeon. There are other cases in which the condition is rendered grave by sepsis, especially gas gangrene; but there remains the majority whose wounds are slight and whose general condition is good.

ANESTHETICS USED.

The methods of anesthesia I have employed are: Ether and chloroform by the open method; ether and chloroform by Shipway's warm vapor apparatus; intravenous ether; spinal anesthesia with stovain; nitrous oxid and oxygen; and local infiltration with novocain.

Let us consider the choice of anesthetic in the various types of cases. We will deal first with the lightly wounded, as they are both the most numerous and the least interesting. Our patients have not been prepared for an anesthetic, so that when brought into the theatre the bowel is full and often the stomach as well. In winter months, difficulty is further increased by the prevalence of bronchitis. A large proportion of the men have cough with expectoration. Autopsies on men who have died of wounds, even when they have had no anesthetic, commonly show the lung tissue to be congested while there is excess of secretion in the tubes. In spite of these failings, the lightly wounded are good subjects for anesthesia. They are for the most

*Read before the Section of Anesthetics of the Royal Society of Medicine, London, 1917.

part young and healthy; they are placid, and have little fear of operation.

The work of the Clearing Station comes in rushes, so that for slight cases the main considerations are *safety, speed and convenience*. The ideal anesthetic is one with which induction is rapid, and recovery complete a few minutes after operation, so that the patient is in fit condition for early evacuation by ambulance train. Apparatus is subjected to much wear and tear, so it should not be complicated or delicate.

Of the anesthetics I have used, gas and oxygen meets these requirements best. Its only drawback are that the apparatus is somewhat cumbersome and the materials costly. Local anesthesia can only be employed in a small number of cases on account of the multiplicity of wounds and their lacerated and soiled condition. Ether remains the most generally used anesthetic. The great majority of slight cases are anesthetized by Shipway's warm vapor method. For induction the mixed vapors of ether and chloroform are used; the process is free from struggling, so that it is seldom necessary for an assistant to stand by the patient. It is rapid: in a hundred cases which were timed induction was invariably complete in five minutes. Anesthesia is maintained with ether alone. There is an absence of secretion, and atropin is not given unless the patient has signs of bronchitis. Consciousness is regained quickly, and vomiting has occurred in only 26 per cent. of all cases, including abdominal cases. Since the warm vapor method was introduced in this Clearing Station last winter, the drop-bottle has passed out of use. Compared with the open method there is a saving of at least 60 per cent. of ether. There is much less diffusion of the anesthetic into the atmosphere of the theatre. This is an important consideration to those working in it at times of sustained pressure.

SPINAL ANESTHESIA.

In choosing an anesthetic for the more seriously wounded, the one overwhelming factor is safety. We require a method which will not be harmful to a patient suffering from the shock of injury, and one which will minimize the shock of operation. It has been urged that spinal anesthesia would meet these requirements and would therefore be of great value in military surgery. For men wounded in the lower extremities I found it a convenient and satisfactory method at a base hospital; cases of profound collapse did not occur. The same good results were obtained at a Clearing Station in all patients who had been wounded not less than forty hours before operation. Of the more recently wounded, however, more than half showed signs of cerebral anemia

with great fall of blood-pressure shortly after intrathecal injection of stovain. These signs were pallor, nausea, retching, vomiting, and loss of consciousness. More rarely I have seen extreme restlessness, and in one case convulsions. The radial pulse disappears and the patient presents an alarming picture of collapse which may necessitate interruption of the operation. It has been stated that collapse during spinal anesthesia is not dangerous. I have seen two cases in which it proved fatal, and have heard of a number similar fatalities in recently wounded men.

It is to the man whose wounds are less than forty hours old, and who has lost blood, that spinal anesthesia is dangerous. This is shown by an analysis of fifty consecutive cases of wounds of the lower extremities operated on at a Clearing Station under stovain spinal anesthesia. The drug was used in 5 per cent. solution, in most cases glucose. A dose of 1 to 2 c.c. was given; when smaller doses were used anesthesia was incomplete, or came on so slowly as to make the method impracticable at a Clearing Station. During injection the patient was placed in either the Barker or sitting position, head and shoulders were kept high for the first fifteen minutes, and then horizontal.

Of the recently wounded patients, by no means all collapsed under spinal anesthesia. It is important that one should be able to recognize beforehand which cases will tolerate this procedure. Is there any physical sign which will prove a reliable guide? The appearance of the patient is of little assistance, the pulse-rate and blood-pressure do not help us at all. *A valuable indication is obtained by determining the concentration of the blood.* The method I employ is to estimate the percentage of hemoglobin in the patient's blood by means of a Haldane hemoglobinometer. This method is simple, sufficiently accurate, and only takes a few minutes to complete. A low percentage of hemoglobin—dilute blood—in a man recently wounded, may be taken to mean that he has lost blood. Control observations on healthy unwounded soldiers showed the normal range of hemoglobin to be from 97 to 120 per cent. with an average of about 110 per cent. as against my standard indicator. *In practice I find that if a recently wounded man has a hemoglobin percentage of over 100 it is safe to administer stovain intrathecally. If the reading is below 100 per cent. he will certainly show a serious fall of blood-pressure, and symptoms of collapse.* In these fifty cases the hemoglobin percentage, blood-pressure, and pulse-rate were recorded before the injection of stovain. After injection, blood-pressure and pulse-rate were registered at intervals of about two and a half minutes

for not less than fifty minutes. The blood-pressure was estimated by means of a Riva-Rocci sphygmomanometer with stethoscope over the brachial artery.

We will divide the fifty cases into three classes:—

Class A.—Men operated on within forty hours of receiving their wounds, whose blood was dilute—hemoglobin under 100 per cent.

Class B.—Men operated on within forty hours of receiving their wounds, whose blood was *not* dilute—hemoglobin 100 per cent. or over.

Class C.—All cases in which a greater interval than forty hours had elapsed between wounding and operation, whether the blood was dilute or not.

In *Class A*—short interval cases with dilute blood—we have twenty-two examples. Of these twenty-two all but three showed symptoms of collapse after injection of stovain. The average fall of blood-pressure was 57 mm. of mercury. In only three cases was the fall of pressure less than 35 mm., the greatest fall was 99 mm.

In *Class B*—short interval cases in which the blood was not dilute—there are sixteen examples. Of these sixteen, thirteen showed no untoward symptoms whatever after injection. Of the remaining three one complained of nausea, and in the other pallor was the only sign. The average fall of blood-pressure was 17 mm. of mercury, and the greatest fall was 33 mm.

In *Class C*—men wounded more than forty hours—there are six examples. None showed any symptoms of collapse. The average fall of blood-pressure was 19.7 mm., and the greatest was 35 mm.

If we divide the cases into classes according to the length of time which elapsed between reception of wound and operation, we find that, until we deal with intervals exceeding forty hours, cases with dilute blood suffer a big fall of blood-pressure, while the fall of pressure in cases with blood of normal concentration is less than half as great. When the interval exceeds forty hours the fall of pressure in both types is small and about the same.

I said that neither the blood-pressure nor the pulse-rate indicate whether a recently wounded man is a suitable subject for intrathecal stovain. We have seen that these cases may be divided into two classes according to whether the blood is dilute or not, and that these two classes react very differently to spinal anesthesia. There is, however, little difference in the average initial pulse-rate and blood-pressure of the two types.

As regards the appearance of the patient, some of those in *Class A* were obviously pale but many were not, although estimation of the hemoglobin showed their blood to be dilute. These patients suf-

fered collapse as profound as those in whom loss of blood was obvious clinically. *The deduction I would draw from these observations is that stovain should not be administered intrathecally to men who have been wounded less than forty hours, unless it has been demonstrated that their blood is of normal concentration.*

Whether other drugs, such as novocain, would be equally dangerous I have no opportunity of determining. We have found the heavy type of solution more satisfactory than that without glucose. The level of anesthesia is more easily controlled when using the heavy solution. As regards fall of blood-pressure, results were about the same with the two solutions. The dose of stovain varied from 0.05 to 0.1 gm., and within these limits fall of blood-pressure was not proportional to dose of drug. Some of the greatest falls of pressure were associated with the smallest doses of stovain, and vice versa. Nor was the fall of blood-pressure proportional to the level of anesthesia.

I will leave it to others to explain why men who have recently lost blood should collapse under spinal anesthesia. Perhaps loss of blood is not the only factor. In secondary hemorrhage there is loss of blood without shock of injury. Do these cases collapse after the injection of stovain? I have no experience.

As regards prevention or combat of the collapse, the most important factor is position of the patient. Fifteen minutes after injection the head should be lowered, and it should be kept low for at least an hour. The practice of propping the patient up on his return to bed is dangerous. One patient in this series, who had no alarming symptoms when in the operating theatre, was propped up on his return to the ward. He became blanched, pulseless and unconscious. He recovered when the head was lowered, the legs raised, and pressure put on the abdomen. Another patient, whose head and shoulders were raised on his return to the ward, died straightway.

Subcutaneous injection of strychnin appears to be without value, both as a preliminary measure to prevent collapse, and subsequently in its treatment. Intramuscular injection of pituitrin proved useless in combating the fall of blood-pressure. Intravenous saline caused temporary improvement in the one case in which it was tried, but the blood-pressure fell again after one and a half hours, and the patient died. This last case was a man with a penetrating wound of the abdomen. Our experience of spinal anesthesia for these cases has been limited and unfortunate. Three men with penetrating wounds

of the abdomen were each given 0.07 gm. of stovain. In each case the injection was followed by a great fall of blood-pressure, and death within a few hours. Lest you should attach undue importance to the personal equation, I should like to say that with spinal anesthesia for appendicectomies our experience has been free from all alarms.

WOUNDS OF THE LIMBS OF EXTREME SEVERITY.

The type of case I refer to is the man suffering from shock. The wounds are recent, and one or more of his limbs are shattered. His face is pale, and the pulse flickering or imperceptible. Another characteristic of the badly wounded man is his low surface-temperature. If put to bed and surrounded with hot bottles his condition usually improves. The blood-pressure is taken every hour, and, if it is rising operation is delayed. This delay must not be too long, or gas gangrene will supervene. The surgeon may be compelled to amputate a limb, and the anesthetist is faced with a pulseless patient who has to undergo a brief but severe operation. The lives of many of these patients may be saved if correct procedure be followed. In the first place morphin should be withheld before operation, or given only in small doses. A recently injured man is particularly susceptible to further shock, and this susceptibility is greatly increased by large doses of morphin. It is my experience that a badly injured patient has a poor chance of rallying if he has received more than $\frac{1}{4}$ gr. of morphin before operation. *If chloroform be used, the patient is likely to die on the table. With ether the patient's condition actually improves during operation, but he will collapse an hour or two afterwards. If the ether be given intravenously, the patient's condition improves strikingly during administration, but there is profound collapse, which is often fatal, within the next two hours.* The cause of death is not edema of the lungs; in no case have I seen any evidence of this condition either clinically or at autopsy. In several cases there was edema of the liver, and in one patient who died an hour and a half after intravenous ether the gut was edematous from stomach to rectum.

Spinal anesthesia is contraindicated, as I have already shown. *Incomparably good results are obtained with gas and oxygen, and no other anesthetic should be used for this type of case.* Anesthesia may be so light that the patient will move when nerves are resected. There is practically no evidence of shock from the operation, even when this is an amputation through the upper part of the thigh. A few of these cases has the blood-pressure fallen 15 mm., or the pulse-rate risen more than ten beats per minute. The patient is fully conscious five minutes after operation, and can literally "sit

up and take nourishment." There is no collapse during the next few hours, and the subsequent progress is notably good.

There is another class of patient who is gravely ill but who is not suffering from shock—I mean the septic case. Early sepsis commonly takes the form of gas gangrene. In a typical case the patient vomits repeatedly, his face is of a pale muddy color, his pulse feeble and running. In spite of this apparently desperate condition, such a patient is a much more favorable subject for anesthesia than one who is suffering from shock.

Intrathecal stovain, which causes collapse in the recently wounded man, has no effect on this same man some days later, although sepsis may have rendered his general condition much more serious. This same distinction is seen with ether anesthesia, whether the ether be given intravenously or by inhalation. *The collapse which occurs after operation on a man who is suffering from shock or recent hemorrhage, is not seen in these later and septic cases. Some of the most brilliant results have been obtained with intravenous ether; the improvement in the patient's condition, which occurs during administration, is maintained afterwards, and vomiting seldom recurs.*

Gas and oxygen also give excellent results. Chloroform is to be avoided: if this drug be used the man's blood-pressure will fall after operation, and he is likely to die within the next twelve hours.

WOUNDS OF THE HEAD.

There is now general agreement that chloroform is a bad anesthetic for head cases. Operation may be performed under local anesthesia; all tissues of the scalp are infiltrated in a circle widely surrounding the site of incision. We generally use a 0.2 per cent. solution of novocain with adrenalin. No pain is felt even when bone or dura are dealt with. On the other hand, the forcible cutting of bone is disturbing to the patient, so that where mentality is unimpaired general anesthesia is preferable. Warm ether vapor is exceedingly satisfactory. The vapor is given by means of a catheter passed down the more patent of the two nostrils; thus the mask is dispensed with and the surgeon has a clear field. The ether is vaporized by passing oxygen through it. Breathing is easy and noiseless and there is no congestion, whatever the position of the patient's head, so that hemorrhage is not unduly provoked.

WOUNDS OF THE ABDOMEN.

It is in this group of cases that the warm vapor method has shown to the full its striking advantages. The quiet induction, free from struggling, may save much loss of blood from wounded vessels in the peritoneal cavity. The easy breathing

and diminished heat-loss leave the patient in remarkably good condition at the end of a long operation. With regard to heat-loss it is interesting to note that with warm ether vapor I have never seen the so-called ether tremor or shivering fit, which is commonly associated with open ether. The absence of vomiting makes it possible to give fluids by the mouth within two hours of the patient's return to the ward. Men with abdominal wounds are particularly liable to develop bronchitis, perhaps owing to the deficient movement of the lower part of the chest. With open ether 54 per cent. of our abdominal cases had bronchitis after operation. With warm ether vapor the percentage has dropped to 14.7. These figures were obtained from two comparable series occurring in the same months of two successive years; only those cases were counted which survived operation more than forty-eight hours.

During the progress of an ether vapor anesthetic, the blood-pressure shows a tendency to rise. *If the operation involves much manipulation of gut and pulling on peritoneum, the pressure will fall.* This fall, however, will be slow, and the process may be continued for hours without reducing the blood-pressure to a dangerous level.

Exposure of gut outside the abdominal cavity produces a much more serious effect on the patient. If more than 2 or 3 feet of gut are so exposed, after a few minutes the blood-pressure commences to fall rapidly and it continues falling until the gut is returned to the abdomen. This effect is seen when the stomach and omentum are exposed, and even with the great omentum alone. *The covering of exposed viscera with pads soaked with hot saline does not prevent this effect on the patient's condition.* Nevertheless it seems probable that the cause is heat-loss from exposed blood-vessels. Exposure of gut produces much less effect on a man who is not under an anesthetic. I have seen men arrive from the line with several feet of intestine prolapsed through a wound, yet their blood-pressure was within normal limits. In one case more than two-thirds of the small gut had been outside the abdominal cavity for at least four hours, yet this man's blood-pressure was 142 mm. of mercury and his pulse-rate only 108: the patient recovered. *Surgeons should be urged to make large incisions and work as much as possible with the gut lying inside the peritoneal cavity.*

Apart from copious hemorrhage there is one other procedure which causes rapid fall of blood-pressure during abdominal operations. This is turning the patient on his side. The effect is produced only if the patient has been under the anes-

thetic for a considerable time before being turned. At the end of an abdominal operation the patient may be in good condition; he is then turned on the right or left side, in order that the surgeon may excise a wound in the back. In a few minutes there is a great fall of blood-pressure and the radial pulse disappears. It may be hours before the patient recovers this lost ground. *The indication is that wounds of the back should be dealt with before laparotomy, as turning the patient has no ill effect during the first half hour of an ether anesthesia.*

For abdominal cases I give oxygen with the ether vapor; no atropin is administered before operation as I have not been able to discover any advantage from giving it. Ether gives better results than chloroform in these cases. With chloroform the blood-pressure falls steadily, and if operation be prolonged the patient may die before the abdomen is closed, or shortly after. *There is one type of abdominal case for which chloroform has advantages—this is the man who has a penetrating wound of the chest as well as of the abdomen.* Here ether cannot be used, as it will, in the majority of cases, provoke fatal intrathoracic hemorrhage. To these patients I now give hyoscin 1-100 gr., atropin 1-100 gr., and morphin 1-6 gr., forty minutes before operation. This is followed by a minimal amount of warm chloroform vapor with oxygen. With this sequence our recovery rate has greatly improved in the chest-abdomen cases, while in the men who died there was no evidence of fresh bleeding into the chest. Still better results are obtained with gas and oxygen, associated with novocain infiltration. (1917.)

With regards to fluids, it has been our practice to give three pints of normal saline subcutaneously during operation. For the collapsed cases this seems to be useless; they do not absorb the fluid. Autopsies on the men who have died as late as thirty hours after operation have shown the bulk of the fluid to be still in the subcutaneous tissues near the site of injection. To these collapsed patients we give saline intravenously, toward the end of operation. *Only a very temporary effect is produced on the blood-pressure if transfusion is completed in the early stages of operation. I find that hypertonic saline raises the blood-pressure, slows the pulse-rate and dilutes the blood for a longer period than does the normal solution.* I hope to give definite records illustrating this point at some later date.

In concluding I wish to acknowledge my debt to my commanding officer and to the medical officers of the Clearing Station to which I am attached. They have given me every assistance in making observation on cases under their care. They have authorized me to say that they are in substantial agreement with the views expressed in this paper. I must add that our views on the choice of anesthetic for the more difficult cases met with at a Clearing Station are subject to a frequent revision. I welcome this opportunity of provoking criticism from those whose experience is so much greater than mine.

(Continued on page 68.)

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA and ANALGESIA

Surgery Publishing Co.

J. MacDONALD, Jr., M.D., President and Treasurer
92 WILLIAM STREET - NEW YORK, U. S. A.

Original papers, Clinical Reports and Experimental Researches on the Theory and Practice of Anesthesia and Analgesia, as well as pertinent Surgical Transactions are solicited for exclusive publication in this Supplement. Typewritten Manuscripts facilitate Editorial Revision and avoid errors.

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Avon Lake, Ohio, U.S.A.

APRIL EDITORIALS. 1918

SOME EXPERIMENTAL RESEARCHES AND CLINICAL OBSERVATIONS ON WOUND SHOCK, BLOOD PRESSURE, ANES- THESIA, ACIDOSIS AND FAT EMBOLISM AT THE FRONT.

The Medical Research Committee of Great Britain has just issued an official bulletin on the "Investigation of the Nature and Treatment of Wound Shock and Allied Conditions." This study and that of Geoffrey Marshall on "Anesthetics at a Casualty Clearing Station" (herewith printed in the Supplement), indicate that the scientific spirit is laboring industriously and effectively even under fire. Marshall's researches speak for themselves, although the Editor has taken the liberty of italicising his more pregnant conclusions. Some points in the report of John Fraser, F. M. Cowell and W. B. Cannon also deserve editorial emphasis.

Their most interesting researches and observations may be summarized as follows:

Scalp wounds show no appreciable alteration in blood pressure. Cases of compound fracture of the skull with dura intact show a relatively high blood pressure, averaging above 140 mm. Penetrating wounds of the skull with free drainage are generally associated with low blood pressure—from 60 to 112 mm. In perforating wounds the blood pressure would appear to vary according to the anatomic distribution of the wound. In those in-

volving the ventricles, the blood pressure is high, varying from 130 to 170 mm; otherwise the pressure is low. *The blood pressure subsequent to wounds of the head is apt to be unstable. If operation is performed under general anesthesia before the blood pressure has become stable, disaster is liable to ensue. Untoward results can be diminished by delaying operation until the blood pressure has become stable or by performing the operation under local anesthesia, with supplemental scopolamin-morphin amnesia.*

The following deductions have been drawn regarding *abdominal wounds*: In patients with intraperitoneal injury of a hollow viscus, arriving at a casualty the systolic pressures varies from 50 to 100 mm. When the period of primary wound shock has elapsed, six to ten hours, rest, warmth and the sedative action of morphin raises the blood pressure. After ten hours secondary wound shock due to sepsis and loss of blood becomes evident. Perforating wounds of moderate severity affecting solid viscera are associated with relatively high blood pressure; wounds of the liver and kidney exhibiting a systolic reading of from 130 to 140 mm even when hemorrhage has been considerable. Perforating wounds of the viscera which do not open into the peritoneal cavity are associated with practically normal pressure removing large amounts of blood from the peritoneal cavity is accompanied with a very rapid fall of blood pressure.

Large open wounds of the *chest* with free entrance and exit of air are accompanied by a profound fall of blood pressure. Patients with uncomplicated closed wounds, who arrive at the Casualty Station well-cared for show normal pressure. *When severe hemorrhage (internal) has occurred and the patient has been exposed to cold for some hours, or when infection has become established, hypotension is present and progressive.* Reaction from perforation or laceration of the diaphragm depends on the amount of hemorrhage or incidence of sepsis or entrance of air.

Compound fractures of the lower extremity, especially in the region of the knee and with hemorrhage show a considerable fall in blood pressure. Particularly even lower blood pressure is associated with fractures of the arm. In face wounds there is not much alteration of blood pressure unless there is an associated compound fracture of the face bones, when the pressure is generally lowered. *Multiple wounds* of the body and extremities are accompanied by a considerable fall in blood pressure.

With regard to *restorative measures* these ob-

servers conclude that: In cases of profound shock with loss of blood excellent results are obtained from direct blood transfusion. Injection of the calcium hypertonic gum solution (calcium chlorid 0.075 gm., sodium chlorid 1.325 gm., gum acacia 2 gm., water 100 cc. sterilized) will produce an immediate rise of pressure in hemorrhage cases or cases of hypotension complicated by toxemia. This rise may tide the patient through an operation. If the source of infection is removed the tension will remain supported. In milder cases of shock and hemorrhage infusion with modified Ringer solution (sodium chlorid 2 gm., potassium chlorid 0.05 gm., calcium chlorid 0.05 gm., water 100 cc.) is useful. Results obtained with physiologic saline by infusion have been unsatisfactory.

It has also been noted that an uncomplicated wound running a favorable course shows a steadily maintained blood pressure. With the onset of gas gangrene or sepsis there is a sudden fall of pressure. Occasionally a long sustained hypotension may persist, although the patient is quite well and no sepsis exists. *A steadily rising or maintained high pressure reading, even in a severe wound, may be taken as a most favorable prognostic sign.*

Cannon thus summarizes his studies in *acidosis*. Cases of low blood pressure due to shock, hemorrhage or infection with gas bacillus have a diminished supply of available alkali in the blood, that is an acidosis. As a general rule, the lower the pressure the more marked the acidosis. The *pulse* is rapid in these cases, but does not vary with the degree of acidosis. The *respiratory rate* becomes more rapid as the acidosis increases until, shortly before death, a true *air-hunger* may prevail. *Blood sugar* is usually somewhat increased above the normal in shock and hemorrhage. The acidosis in these cases, therefore, is not due to lack of circulating carbohydrate.

Operation on men suffering from shock and acidosis result in serious and rapid sinking of arterial pressure, when it is already low, and in marked and sudden decrease of the alkali reserve of the blood when that reserve likewise is already low. This change may not occur if nitrous oxid-oxygen anesthesia, instead of ether, is employed, but that anesthetic affords no guarantee against the ominous decline. Shocked men, suffering from extreme acidosis with *air-hunger* can be quickly relieved of their distress by intravenous injection of a solution of sodium bicarbonate and their blood pressure restored to normal."

Cannon has also drawn attention to *fat embolism* following fractures of the larger bone, as a causative factor in primary shock, with resulting

acapnia, which is best combatted by *carbon dioxide rebreathing*.

Cannon's conception of shock is one of *exemia*,—a term originated by Hippocrates and signifying the draining of blood from essential parts of the circulatory system, especially by capillary concentration.

Cannon thus correlates the factors involved: primary wound shock of a reflex character with a rapid fall of arterial pressure; sweating, exposure, inactivity, delay and lack of fluid forming a vicious circle in promoting an excessive loss of body temperature resulting in accumulative stagnation in the capillaries until a persistent low blood pressure becomes established. The blood thus lost from currency produces a state equivalent to hemorrhage and any true hemorrhage exaggerates the existent *exemia*. Irrespective of primary wound shock, cold hemorrhage and toxemia will bring about the same sequence of events. As the low blood pressure continues the alkali reserve of the blood is reduced and acidosis begins. Previous starvation and fatigue favor its more rapid development. This state by locally relaxing vessels, which are not under nervous control, by weakening cardiac contraction and increasing the viscosity of the blood, tends to make worse the dangerous condition already established. The individual with acidosis is sensitized and operation and anesthesia, increasing acidosis and further lowering blood pressure, exaggerate the hazard involved in surgical procedures.

Prophylactic measures consist in providing warm alkaline drinks for the wounded at the earliest moment, warm, dry clothes, heating cabinets or devices for combating chill, sweating and exposure. Cautious use of opiates to relieve pain and quiet restlessness; and the intravenous use of hypertonic sodium bicarbonate solution, one pint in about 15 to 20 minutes during the initial stage of the surgical procedure. Then the operation ends, not with an increase of the existent acidosis, but with an alkaline reserve provided. The blood pressure instead of being perilously lowered is actually raised during the critical period. The blood pressure may fall to some extent later, but the improved state of the patient during operations under anesthesia is unmistakable, and the subsequent course of shock cases with the precautions described has been highly gratifying.

American anesthetists, who, for some years past, have been in touch with the researches of Gatch, Mann, Vandell, Henderson, Hogan, Levy and McKesson will find nothing startlingly new in the report of the Medical Research Committee. Its report, however, bears evidence that the profession-at-large is awakening to the fact that surgery and anesthesia involve many intricate problems in physio-pathology that cannot be solved with the knife or inhaler.—McM.

1918—MEETINGS—1918.

The American Association of Anesthetists will hold its Sixth Annual Meeting in Chicago, June 9-10. The scientific sessions will occur on the evenings of the A. M. A. clinic days, so that all surgeons, anesthetists, research-workers and specialists, who are in Chicago at the time of the A. M. A. meeting, may attend without missing any of the sessions of their own sections. A splendid program has been arranged. Owing to the death of Dr. F. W. Nagle, the first Canadian President of the Association, Dr. A. H. Miller will act as presiding officer. In Captain J. T. Gwathmey's absence in service, the Editor of the Supplement will be pleased to furnish any further information regarding membership, sessions and banquet reservations.

The Interstate Association of Anesthetists will meet with the Indiana State Medical Association in Indianapolis, Ind., September 25-27.

ANESTHESIA AT THE FRONT

(Continued from page 65.)

NITROUS OXID-OXYGEN WITH REGULATED REBREATHING IN MILITARY SURGERY.*

CAPTAIN H. E. G. BOYLE, R.A.M.C.(T.),

Anesthetist to St. Bartholomew's and the First London General Hospital.

The anesthesia produced by the combination of nitrous oxide and oxygen with rebreathing, and ether, or chloroform and ether when necessary, is one that should appeal to anyone who has the interests and welfare of his patients at heart. The easy induction, the rapid and comfortable recovery are factors that all men who are interested in anesthesia will at once appreciate.

The anesthesia and the technic that I shall attempt to describe is what I have been using at the First London General Hospital. To begin with, the patients are given a preliminary injection of morphin, atropin, and scopolamin about half an hour before the time of operation. I think that half an hour is sufficient to enable one to get the full value of the injection during the anesthesia. Of course, it is not always possible to be sure that half an hour has elapsed before starting the anesthesia, for it is obvious that in a busy morning of 12 to 15 cases it is at times difficult for the sisters to estimate correctly the exact time at which any one case will get to the theatre. I know that I have anesthetised patients who had only just had the injection and patients who had had it an hour or more beforehand. The proportions of the injection that I use are: Morphia tartrate, 1/6 gr.; atropin sulphate, 1/120 gr.; scopolamin, 1/100 gr. This is made up so that 5 minims is the dose.

The apparatus that I use is Gwathmey's, and consists, as you see, of four cylinders, two N_2O and two O. The supply of N_2O and O is controlled by means of two graduated taps, which permit the gases to flow through the glass bottle containing water in a proportion that can be seen, so that one has visual evidence of how much of each gas is being inhaled by the patient. The gases may go direct to the patient via the rebreathing bag, or may be directed through the bottle containing either ether or chloroform and ether, or such mixture as the administrator chooses

to place there. The face-piece has at its top a valve to permit a certain amount of intake and output of air and mixed gases, but in actual practice one does not use this valve a great deal except for those patients who will not stand prolonged rebreathing on account of attempts at vomiting during the anesthesia.

TECHNIC OF ADMINISTRATION.

One of the most important factors in the production of good anesthesia is that during the induction the room should be absolutely quiet. This condition, great as I know the importance of it to be, is well-nigh impossible at a base hospital, as those of us who work there well know, but it can be ensured even there, and in private practice we ought to insist on it.

Position.—Gwathmey lays great stress on the importance of having the patient absolutely flat, without even a small pillow, alleging that he finds that breathing is better. My own experience leads me to think that patients as a rule do not like their heads quite so low, and my usual practice is to have the head slightly raised during the induction, and when anesthesia is complete I gently lower the head to the horizontal.

Dental Prop.—I frequently insert a small dental prop between the teeth before starting the anesthesia. The point to be careful about is to observe whether the patient breathes easily through the nose, and if he does not, or if the nose is a narrow one, with very thin alæ nasi, then I always insert a prop. I have found that patients who have these thin alæ nasi will give trouble unless a prop is inserted. The alæ are drawn in towards the septum and the patient makes violent efforts to breathe, but gets nothing or next to nothing into his lungs. When this happens the patient becomes pale, with a bluish tint around the mouth, the pupils dilate, and sweating comes on. Treatment for this condition is to open the mouth and get air and oxygen into the lungs.

ADMINISTRATION.

The bag is three-parts filled with N_2O and O in the proportion of 4 to 1—that is to say, oxygen is allowed to bubble through one hole and nitrous oxide through four. The face-piece is adjusted to the face and the gas-valve turned on. And here, let me say, that the face-piece must fit accurately. If air is allowed to get in at the sides the even course of the anesthesia will be greatly hampered and there will be a period of excitement and struggling. The valve at the top of the face-piece is kept open for a few breaths and then turned off, so that rebreathing starts almost from the beginning. The supply of nitrous oxide is now increased until it is flowing in freely through all the apertures and even through the tube itself. I do this to lessen the period of induction, for I hold strongly that the period of induction ought always to be as short as possible—seeing that it is the most unpleasant. In a very short time the patient's breathing grows deeper and more regular until eventually in about three to four minutes it takes on that automatic rhythm which is such a constant sign of anesthesia.

It is necessary to keep a strict watch on the patient's color, and any degree of cyanosis must at once be remedied by the addition of a little oxygen. It is remarkable how readily these patients respond to oxygen, so much so that only a very little is needed to change the color back to pink. In my early cases I did not realize this fully and gave oxygen until the pink color returned, and in consequence in a few cases I very nearly brought my patient out of the anesthetic state. I now find that it only needs a short, sharp turn of the oxygen valve which opens three or four holes for about two seconds.

As soon as anesthesia has been attained the amount of nitrous oxide coming over is reduced to 4, the oxygen being at 1. With this rate most patients will go on perfectly well and rebreathing can be continued most of the time. If, however, the patient begins to retch or vomit then I think that there is too much rebreathing and one opens the valve on the face-piece and increases the supply of both oxygen and nitrous oxide.

If it is required to deepen the anesthesia the pressure in the bag must be increased until when an expiration takes

* Read before the Medical Society of London, October 29, 1917.

place the bag becomes taut. This will deepen the anesthesia in a few seconds, but the patient needs careful watching lest he get blue.

Page prefers to give ether to deepen the anesthesia rather than to push the N_2O under pressure, and on the whole I agree with him.

The signs of overdosage are first of all noisy and stertorous breathing, followed by twichings of the muscles and accompanied by cyanosis. None of these signs ought to occur in a well-given anesthetic. The remedy, of course, is more oxygen.

The aim of the administrator should be to get an even anesthesia, and this is best obtained by being quite sure that the true state of anesthesia is present before the operator starts, and the keeping the supply of gases at as constant a level as is possible. *Anxious movements of the supply taps only lead to bad anesthesia.* In this, as with other methods of anesthesia, the importance of the open and free airway must never be forgotten.

Mixtures.—It sometimes becomes necessary to add either ether or C.E. mixture to the gas and oxygen in cases where extra relaxation of the muscles is required, or during amputations, when the nerves are being severed. And here, let me say, that I have observed that when large nerves are cut in nearly every case the patient moved unless he was being given ether or C.E. This movement does not appear to do any harm, but is troublesome for the operator. Occasionally, if one is having a little difficulty during the induction in obtaining anesthesia, I find that the addition of ether for a few seconds is frequently enough to produce the required state, but one must be careful not to keep the ether on for long, as this causes coughing and holding of the breath. Just turn it on and off, the whole movement taking about two seconds, and repeat this at intervals of one to two minutes until anesthesia is complete. I have seldom found it necessary to give ether or mixture continuously for long—three to four minutes being probably as long as it is ever necessary.

I am not at present prepared to make any definite statement as to the relative values of ether or chloroform and ether with this method, and have up to the present only added chloroform when I have come across some especially burly or alcoholic patient who needed something more potent than ether alone. I find on going through my cases that 38 per cent have had ether or chloroform and ether.

Rebreathing.—Those of us who were in the habit of giving prolonged nitrous oxid and oxygen with a Hewitt's apparatus know that it was a wasteful method—wasteful of the gases, but, what is more important still, wasteful of the patient's energies. A long nitrous oxid and oxygen without rebreathing frequently left the patient in a very exhausted state. They often had profuse sweatings, and in a good many instances patients were far from well for some hours afterwards. With regulated rebreathing, however, this is not the case. The patients keep a good color and their temperature is, if anything, slightly raised, and there should be no sweating. The temperature of the expired air as felt when the valve at the top of the face-piece is opened is warm to the hand. I have not thought it of sufficient importance to have this air analysed or to record its temperature.

Overdose.—The treatment for overdose is rapidly to remove the mask and start artificial respiration together with the administration of oxygen, remembering always to keep the airway clear.

POST-OPERATIVE CONDITION.

The post-operative condition of patients who have been anesthetized with nitrous oxid and oxygen with rebreathing and with a little ether when necessary, is to me one of the most striking points of the method. The patients are conscious within two or three minutes of the removal of the anesthetic, and in the majority of cases are not sick. At the First London General Hospital I have had records kept of consecutive cases, and the result is that of 200 consecutive cases 13 were sick once, 4 twice, and 3 had prolonged sickness (i. e., 2 most of the night and 1 for 2 days.)

There is in a fair proportion of cases a feeling of nausea which lasts for about 20 minutes, and occasionally there

is some headache, which is probably due to too much rebreathing for the particular patient, but beyond that the recovery is perfect. There is no horrible taste of ether in the mouth, no waves of ether vapor coming over as the patient eliminates the drug. And this holds good, even if a little ether has been given during the early stages of the anesthetic.

One of my most striking cases was an officer who had had the semilunar cartilage removed. The operation lasted about 40 minutes and finished at 5.30 P. M. At 7.30 P. M. he enjoyed a full dinner, a result that I think is unobtainable with the older methods.

Since both of the gases are non-toxic it follows that this combination is especially suited to those cases of which we have all seen such a number—the badly wounded and septic man. These cases do particularly well, and at the First London General Hospital we have records of three cases of amputation at the hip in men who were profoundly septic and who have all done splendidly.

I wish that I were possessed of sufficient power of oratory to paint you a real word-picture of the after-condition of the patients, but, alas, I am unable to do it justice. For a proper appreciation of the condition one should see the operation and the patients afterwards. There is one point, however, that I should like to bring before you as a result of my analysis of 200 consecutive cases at the First London General Hospital. It is that I observe that in most of the cases there is no appreciable rise in temperature after the operation. We are most of us familiar with the rise of temperature as shown on the temperature charts after an operation. This does not appear to be the case after an administration with this combination.

At Queen Alexandra's Hospital for Officers at Highgate, where I have used this method extensively, Mr. H. J. Paterson—who is in charge of the hospital—has observed and commented on the fact that there is no rise in temperature after this anesthetic, and I hope that he will tell us the results so far as the officers under his charge are concerned. The temperature remains steady when clean cases are being dealt with, and even in septic ones I find that the rise is not as great as with other anesthetics.

SUMMARY OF CASES.

Administered by H. E. G. Boyle..... 550
Administered by J. F. Trewby and residents at First
London General Hospital..... 161

Total 711

Of these, 5 have had bronchitis, and 1 of these 5 has had slight broncho-pneumonia.

Of the 550 cases administered by H. E. G. B., 38 per cent have had either ether or C.E. mixture (2 have had $CHCl_3$ alone).

Fatal cases, nil.

	During	After	Once	13
			Twice	4
Vomiting	1	20	Bad vomiting; 2 most	
			of the night, 1 for 2	
			days	3

Thus only 15% had what could be termed "bad" vomiting. Temperature: Highest rise, 101° - 105° (drainage of buttock). Average rise, 0.9 of a degree. Three men complained of pain (all of them were bone cases). Two men said that they preferred to come round 2-3 hours after operation. One appendix— $CHCl_3$ added for relaxation, but this was not good. One hemorrhoids—C.E. added, but was difficult to keep quiet. One amputation above ankle required 1 ounce of ether. (This is the largest amount of ether that any of the 200 cases have had.)

Nursing Care.—The work of the nurses is considerably lessened when this combination is employed, for it is obvious that if on the return to the ward the patient is conscious and not vomiting he does not need the undivided attention of a skilled nurse. And this point is of extreme importance in a large military hospital, since it often happens that 8 or 10 operations may be all from the same ward during a morning's work. The contrast between 8-10 semi-conscious and probably vomiting patients and 8-10 men

which the conscious and not sick is one that appeals greatly to the patient.

I have been at some pains to discover the opinion of the sisters and nurses with regard to their patients after this method. From the various hospitals which I have made at the various private hospitals for officers to which I am attached, as well as at St. Bartholomew's and the First London General Hospital, the consensus of opinion is that they much prefer to have their patients given gas and oxygen to anything else.

In conclusion let me say that my reasons for bringing this matter forward are because I am quite convinced that it is an advance on the older methods of anesthesia and, from the patient's point of view, it is infinitely a better form of anesthetic than ether or chloroform, for after this combination the recovery in the great majority of cases is devoid of those unpleasant and distressing conditions with which most of you are familiar.

This paper, then, may be taken as an attempt to procure a more extended use of gas and oxygen with regulated rebreathing in major surgical procedures, and especially in the treatment of our wounded.

My own experience of this method with our wounded men has been confined to work at the First London General Hospital and to various hospitals for officers in London, and I unhesitatingly say that in my opinion the combination of anesthetics which I have attempted to describe is infinitely better for most of the men than ether, chloroform or mixtures thereof. Of conditions at the front I cannot speak with such certainty, as I have, unfortunately, not been there, but it appears to me that it would be of considerable advantage out there if after most of the operations the patients were conscious within a few minutes. It would lessen the work of the orderlies and nurses, and, apart from this aspect of the matter, we must remember that this anesthetic is non-toxic, and therefore there is less strain put on the patient, seeing that he does not have to eliminate the drug, be it ether or chloroform, from his system. Moreover, there is no shock after gas and oxygen.

Finally, let me give one word of warning. This combination of anesthetics is not one to place in the hands of the careless or inexperienced—it requires skillful administration and if used carelessly will inevitably lead to disasters.

ANESTHESIA FOR DRESSING PAINFUL WOUNDS

Captain Louis J. Hirschman, U. S. Base Hospital No. 17, American Expeditionary Force, France, after a tour of the various base hospitals and the methods employed, describes an effective method of anesthesia for dressing painful wounds:

"In the dressing of painful wounds a very valuable method of anesthetizing the patient is used without danger, even though required daily. The formula of the anesthetic is

Ethyl chlorid	5 cc.
Chloroform	1 cc.
Ether	24 cc.

A piece of flannel cloth is saturated with the entire amount and placed over the patient's face. This is covered with another piece of flannel and this in turn is covered with oil silk containing a small aperture, fitting over the nostrils. This is tied around the patient's face with a bit of tape or rubber tubing. The anesthesia produced will last for 10 minutes and the dressing can be started on the second breath. This anesthesia is apparently devoid of danger, is not accompanied by unpleasant complications, is followed by no deleterious after-effects and is welcomed by the patient. (Journal A.M.A., December 1917.)

Savariaud, although he uses ethyl chlorid alone finds it equally efficacious. Savariaud comments on the difference between the dressings of peace and those required for extensive, ragged shell wounds. When the dressings on these large shell wounds are changed, an anesthetic cannot be dispensed with, and he has found ethyl chlorid best adapted to the purpose for reasons which he enumerates. He protects the patient's eyes with a pad or four

or five thicknesses of gauze, and then lays a square of oiled silk over the head, large enough to cover the face and tuck the four corners under the head. A small hole is made in it only large enough to admit the tip of the ethyl chlorid tube. By spraying it gently, progressive and continuous anesthesia is realized, and it can be kept up at the rate of 1 c.c. for each minute of the anesthesia. (Presse Medicale, January 31, 1916).

Boureau highly recommends the substitution of ethyl chlorid for chloroform and ether in war surgery because of its rapid action, because it is much less toxic, having no deleterious effect on the heart, respiratory apparatus, liver, or kidneys, and because of its rapid elimination, all but one twentieth of the amount in the blood passing out within four minutes after its administration, whereas in the case of chloroform one-third and in that of ether one-seventh of the amount still persists in the blood after one hour. In military practice much time is saved through the rapidity of induction of anesthesia and also through the fact that immediately after the operation most of the wounded can leave the ambulance hospital in the sitting position, instead of recumbent. For the initial cleansing of wounds, extraction of missiles, ligation of vessels, and painful dressings, ethyl chlorid is decidedly the agent of choice, and those who have taken it prefer it to ether or chloroform. Boureau's recent experience with it covers nearly 2,000 cases, including 212 missile extractions, 135 removals of bone fragments, fifty-seven amputations or operations on flaps, thirty-six resections, including the knee, shoulder, and elbow, twelve astragalectomies, twelve nerve sutures. Not the least untoward happening attended the anesthesia in any instance, though operations lasting as long as an hour and three quarters were performed under it. All special inhalers were discarded in favor of a four layer compress or rather thick cloth or a mere handkerchief, on which two or three cubic centimeters of kelen were dropped to start with. Although plenty of air was allowed the preanesthetic period never exceeded one minute. After fifteen or twenty seconds the dose of kelen was renewed and the cloth brought tightly to the face, and a minute and a half or two minutes later, complete resolution was obtained, the corneal reflex disappeared, the pupils dilated, and the operation was begun. Anesthesia was then kept up by dropping about one cubic centimeter of kelen on the compress every minute. Slight convulsive movements of the limbs were found to indicate the giving of a little pure air, when they promptly passed off. (Presse Medicale, May 21, 1917).

ANESTHESIA AND ANESTHETICS IN WAR SURGERY.

Dr. Bilhaut, surgeon of the Hôpital International de Paris, has addressed a communication to the Société de pathologie comparée on the subject of general and local anesthesia in war surgery. He accords the preference to chloroform. He finds chloroform easier to administer than ether and less likely than ether to cause a chilling of the respiratory tract, such as may produce pneumonia or pulmonary congestions. In 812 important operations performed by Bilhaut there were no unhappy results from the use of chloroform. The reaction on the liver has been found negligible. In case an operation may require some time, the surgeon should have recourse to general anesthesia. During the course of an operation it is deplorable to have to substitute narcosis for local anesthesia. Therefore, from the very outset, the surgeon should make a definite choice, and in case of doubt he should decide in favor of general anesthesia. In skeletal lesions, which are so frequent, general anesthesia is indispensable. Long bone resections and the removal of bone splinters should be undertaken with scrupulous care, even down to the minutest details, in order to preserve the periosteum, as the significant experiments of Professor Ollier have proved. Without general anesthesia, one cannot bring to a satisfactory conclusion this extremely delicate work, which is indispensable in order to secure anything like complete restorations. It is only by proceeding thus that Bilhaut has obtained in his war surgery the complete reparation, without shortening (real or apparent), of extensive losses

of substance in the long bones. Local anesthesia (cocain, stovain, novocain, freezing) should be confined strictly to minor operations of short duration.

Dr. Fiessinger has called attention to the fact that the results obtained by Bilhaut seem to prove that the operations performed on soldiers under war conditions give better results than in times of peace. It seems as if the new conditions created by the war have brought about an increase in the potency of organic defense. Under ordinary conditions it seems that ether might possibly be superior as an anesthetic to chloroform, since it does not cause alterations of the hepatic cells; however, it would appear from the communication of Bilhaut that, under the existing conditions, chloroform has lost part of its injurious properties.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

AMERICAN ASSOCIATION OF ANESTHETISTS SIXTH ANNUAL MEETING.

The Sixth Annual Meeting of the American Association of Anesthetists will be held in Chicago, June 9-10, the scientific sessions being held on the evenings of the A. M. A. clinic days. It is anticipated that this innovation will enable all interested surgeons, research-workers and anesthetists to attend the meeting without missing any of the clinics or scientific sessions of their A. M. A. sections.

Owing to the untimely death of Dr. F. W. Nagle, the late president of the Association, Dr. A. H. Miller will preside.

The following are some of the papers of interest that will be presented:

President's Address, A. H. Miller, M.D., Providence, R. I.; Experiences of an Anesthetist at the Front, Major W. B. Howell, C.A.M.C., Montreal, Canada; Some Observations on the Teaching of the Pharmacology of Anesthetics, Torald Sollman, M.D., Cleveland, O.; Combined Anesthesia for Cesarean Section, J. Clarence Webster, M.D., Chicago, Ills.; The Prophylactic Use of Pituitrin for Hemorrhage in Nose and Throat Operations under General and Local Anesthesia, Samuel Salinger, M.D., Chicago, Ills.; Blood Pressure as a Guide During Major Operations, Harold G. Giddings, M. D., Boston, Mass.; Nitrous Oxid-Oxygen Analgesia in Normal Labor and Operative Obstetrics, W. C. Danforth, M. D., Evanston, Ills.; Gas-Oxygen Analgesia for Short Anesthesia in Daily Practice, Will Walter, M.D., Evanston, Ills.; Deaths During Operations in Relation to the Surgeon, the Anesthetist and the Hazardous Risk, E. M. Sanders, M. D., Nashville, Tenn.; Accidents from Local Anesthetics—a Preliminary Report, Robert A. Hatcher, M.D., New York City, N. Y.; Recent Studies in Postoperative Pneumonitis, A. O. Whipple, M. D., New York City, and the Operative Risk in Cardiac Disease, F. A. Willins, M. D., Mayo Clinic, Rochester, Minn.

The following are the candidates for officers for 1919: W. B. Howell, M.D., Montreal, Canada, President; Joseph E. Lombard, M.D., New York City, Myra E. Babcock, M.D., Detroit, Mich., and Ray A. Rice, M. D., Columbus, O., Vice-Presidents; James T. Gwathmey, M.D., New York City, Secretary-Treasurer; Harrington Marr, M.D., Nashville, Tenn., and John W. Seybold, M.D., Denver, Col., Members of the Executive Committee.

In the absence of Capt. J. T. Gwathmey in service abroad, the Editor of the Supplement will be pleased to furnish any further information about membership, banquet reservations, and place of meeting.

F. H. McMECHAM, M.D.,

Avon Lake, Ohio.

Sec'y-Pro-Tem.

IN MEMORIAM.

F. W. NAGLE, M.D.,
Montreal, Canada.

President of the American Association of Anesthetists.

The American Association of Anesthetists has suffered a great loss in the untimely death of its first Canadian President, Dr. F. W. Nagle, of Montreal, who was to have presided at the forthcoming Chicago meeting.

Dr. F. W. Nagle was asphyxiated by motor fumes early on the morning of January 25 while working at his motor car outside his garage in the rear of his home. The car stuck in the snow, and it is thought Dr. Nagle got under it to dig away the obstruction when he was overcome by the fumes from the exhaust. He had an appointment at the Royal Victoria Hospital, of which he was staff anesthetist, and was hurriedly making ready to go there in his car when he met his death.

The body was found under the car by a nurse in the employ of the family, who had gone out to report receiving a telephone call. It was thought at first Dr. Nagle had fainted, and a hurry call was sent for Dr. Joseph Kauffman, one of his closest friends, who realized at once what had happened, but, hoping there was a chance of saving Dr. Nagle's life, sent in an emergency call for an ambulance. Meanwhile Dr. Kauffman tried to restore Dr. Nagle's life by means of artificial respiration, and similar efforts by a number of physicians at the Royal Victoria Hospital proved unavailing.

It is not known exactly how long Dr. Nagle had been working at his car before he was overcome, but the engine had stopped for lack of fuel before the discovery was made by the nurse. Dr. Nagle had evidently been getting ready to adjust his tire chains.

Dr. Nagle was 38 years of age. He was born at Ferguson Falls, Ont., and was educated at Almonte, Ont., and at Ottawa College. He studied medicine at McGill University, graduating in 1908 with honors. During his college course he made a special study of anesthetics, and on graduation was appointed anesthetist to the Royal Victoria Hospital, a position he held up to the time of his death. Dr. Nagle traveled widely for study and research work in his specialty, was the author of many outstanding articles, and became recognized as a prominent authority on anesthetics.

He was also anesthetist to the Montreal Maternity Hospital.

He was elected President of the American Association in 1917.

He is survived by his widow, formerly Miss Georgie Ewing, five children, his father and mother, Mr. and Mrs. F. W. Nagle; one brother, James Nagle, and a sister, Miss Ella Nagle. Another brother, Sergeant Gregory Nagle, was killed in action in France last year.

Dr. Nagle was buried at Almonte, Ontario.

It is a pity that this sterling anesthetist should not have been spared to act as the first Canadian President of the American Association of Anesthetists, to emphasize the amalgamation of professional interests that is taking place between the two countries. His confreres, who had learned to admire and love him, can only join in extending their heartfelt sympathies to his dear ones in their bereavement and tragic loss.

REPORTING ACCIDENTS FROM LOCAL ANESTHETISTS.

EDITOR ANESTHESIA SUPPLEMENT:

The Committee on Therapeutic Research of the Council on Pharmacy and Chemistry of the American Medical Association has undertaken a study of the accidents following the clinical use of local anesthetics, especially those following ordinary therapeutic doses. It is hoped that this study may lead to a better understanding of the cause of

such accidents, and consequently to methods of avoiding them, or at least of treating them successfully when they occur.

It is becoming apparent that several of the local anesthetics, if not all of those in general use, are prone to cause death or symptoms of severe poisoning in a small percentage of those cases in which the dose used has been hitherto considered quite safe.

The infrequent occurrence of these accidents and their production by relatively small doses point to a peculiar hypersensitiveness on the part of those in whom the accidents occur. The data necessary for a study of these accidents are at present wholly insufficient, especially since the symptoms described in most of the cases are quite different from those commonly observed in animals even after the administration of toxic, but not fatal, doses.

Such accidents are seldom reported in detail in the medical literature, partly because physicians and dentists fear that they may be held to blame should they report them, partly, perhaps, because they have failed to appreciate the importance of the matter from the standpoint of the protection of the public.

It is evident that a broader view should prevail and that physicians should be informed regarding the condition under which such accidents occur in order that they may be avoided. It is also evident that the best protection against such unjust accusations and the best means of preventing such accidents consist in the publication of careful, detailed records when they have occurred, with the attending circumstances. These should be reported in the medical or dental journals when possible, but when for any reason this seems undesirable a confidential report may be filed with Dr. R. A. Hatcher, 414 East Twenty-sixth street, New York City, who has been appointed by the committee to collect this information.

If desired, such reports will be considered strictly confidential so far as the name of the patient and that of the medical attendant are concerned, and such information will be used solely as a means of studying the problem of toxicity of this class of agents unless permission is given to use the name.

All available facts, both public and private, should be included in these reports, but the following data are especially to be desired in those cases in which more detailed reports cannot be made:

The age, sex and general history of the patient should be given in as great detail as possible. The state of the nervous system appears to be of especial importance. The dosage employed should be stated as accurately as possible; also the concentration of the solution employed, the site of the injection (whether intramuscular, perineal or strictly subcutaneous), and whether applied to the mouth, nose or other part of the body. The possibility of an injection having been made into a small vein during intramuscular injection or into the gums should be considered. In such cases the action begins almost at once—that is, within a few seconds.

The previous condition of the heart and respiration should be reported if possible; and, of course, the effects of the drug on the heart and respiration, as well as the duration of the symptoms, should be recorded. If antidotes are employed, their nature and dosage should be stated, together with the character and time of appearance of the effects induced by the antidotes. It is important to state whether antidotes were administered orally or by subcutaneous, intramuscular or intravenous injection, and the concentration in which antidotes were used.

While such detailed information, together with any other available data, are desirable, it is not to be understood that the inability to supply such details should prevent the publication of reports of poisoning, however meager the data, so long as accuracy is observed.

The committee urges on all anesthetists, surgeons, physicians and dentists the making of such reports as a public duty; it asks that they read this appeal with especial attention to the character of observation desired.

Trigemin. Resear. in U. S. Minister of the Council on

Pharmacy and Chemistry of the American Medical Association.

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VOL. XXXII.

MAY, 1918.

No. 5

CONCERNING NEWER METHODS OF URETHRO-VESICAL DIAGNOSIS AS APPLIED TO THE NECK OF THE BLADDER AND POSTERIOR URETHRA.*

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To the cystoscopist the internal vesical sphincter, the juxta sphincteric region, and the posterior urethra present greater difficulties in diagnosis than any other portion, of either the urethra or bladder. Not only is it extremely difficult to properly visualize the region of the internal vesical sphincter because of its peculiar anatomic construction, and because of the close proximity of the sphincter muscle and optical instrument, but it is almost impossible to correctly estimate the character and extent of the lesions that occur outside of the pale of the mucous membrane, namely, within the territory of the prostatic tissue, and within the sphincter muscle itself.

My paper will include a résumé of what I consider the best methods of visualizing the region of the vesical neck and posterior urethra, with a brief summary of the field of application of the various types of instruments, and will also offer a description of a new cysto-urethroscope that I have been using for somewhat more than a year, and that has been found extremely useful both in diagnosis and therapy.

Two factors, it must be remembered, come into play at the internal vesical sphincter, and are responsible for many of the difficulties of diagnosis in this region—namely, the lack of dilatability of the bladder neck and its muscular activity.

Lesions at the internal sphincter may produce distortions in various planes, and the choice of the method of examination to be employed, depends, in a sense, upon the plane in which such alterations take place. Thus, it is impossible for any single one of the various instruments or optical systems to give full information regarding every lesion, either at the neck of the bladder or in the posterior urethra. Theoretically, we should have recourse at least to three different types of optical systems in

order to obtain a view in all the possible planes, in which lesions may dispose themselves. I say this, however, with a reservation, namely, that we are unfortunately limited, in visual diagnosis, to distortions and intrusions that occur within the urethro-vesical lumen, knowing very little of what occurs in the eccentric, intramural, extra-urethral or extra-vesical directions.

Fig. 1—will clarify what I mean, and will also show what we may expect to see with the three types of instruments.

In the posterior urethra, the planes in which lesions may be viewed are tangential to the elements of a theoretical cylinder lying in the urethral canal (Fig. 2). Vertical, sagittal, or transverse planes perpendicular to these will contain the various elevations or intrusions of the urethral membrane.

It is the indirect or prismatic type of cysto-urethroscope that will enlighten us best as to lesions in these planes (Fig. 2); and, when the urethra is dilated, will give excellent views, not only of the horizontal planes that lie lengthwise in the urethra, but also of those sagittal vertical planes that are perpendicular to the former.

At the neck of the bladder, however, by reason of the muscular closure, and the close contact of the sphincter and the instrument, elevations or intrusions in planes perpendicular to the shaft of the instrument are barely discernible, except under special circumstances. Here, therefore, the scope of the prismatic or indirect cysto-urethroscope is limited to distortions in a sagittal direction parallel with the shaft of the instrument. That is, at the sphincteric margin the cysto-urethroscope of the indirect type affords pictures of linear alterations lying in planes that represent a theoretical continuation into the bladder of the walls of the urethra. Thus, at the margin of the sphincter a sub-cervical elevation may be difficult to estimate, whereas, a similar sub-mucous growth that produces an intravesical intrusion, in a sagittal sense, would be beautifully shown (Fig. 2.) It is clearly evident that other instruments are required for changes that occur in the vertical planes.

Such vertical planes may be viewed, either from in front (from the urethral side) (Fig. 3), or from behind (from the bladder side) (Fig. 4).

*Read before the Section on Genito-Urinary Surgery of the New York Academy of Medicine—Nov. 22nd, 1917.

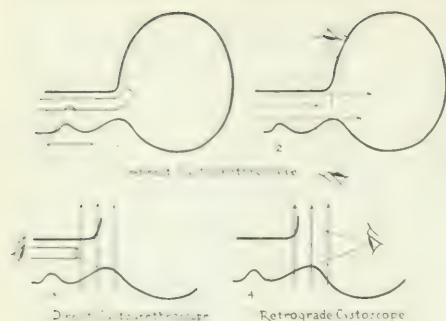


Fig. 1—Diagram showing the indirect cysto-urethroscope* inspecting the flow of the posterior urethra, the arrow lying in the plane in which objects are seen.

Fig. 2—A theoretical cylinder lies in the posterior urethra, and intrusions at the sphincteric margin are best seen when they lie in the plane of the arrow, that is, in a sagittal direction.

Fig. 3—Posterior urethra and neck of the bladder viewed from the urethral side by means of the direct cysto-urethroscope.

Fig. 4—View from the vesical side of the bladder viewed from the vesical side, as seen with the indirect cysto-urethroscope.

* Indirect cysto-urethroscope with auxiliary urethral cyst-urethra-roscope.

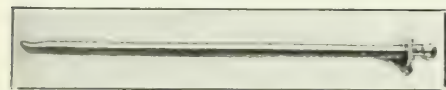


Fig. 5—Section of cysto-urethroscope tube of the author's Universal Cysto-urethroscope, as seen with the indirect cysto-urethroscope.

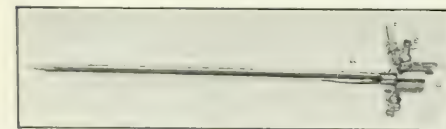


Fig. 6—Light carrier of the direct telescopic cysto-urethroscope, as seen with the indirect cysto-urethroscope, showing the light carrier, the observation tube, the direct cysto-urethroscope, and the indirect cysto-urethroscope.

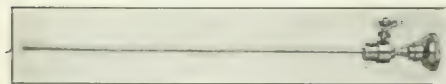


Fig. 7—Universal urethroscope; a, conical fitting; b, auxiliary urethral cysto-urethroscope.



Fig. 8—Normal verumontanum as seen with the indirect cysto-urethroscope, showing the normal verumontanum, the urethra, and the verumontanum.

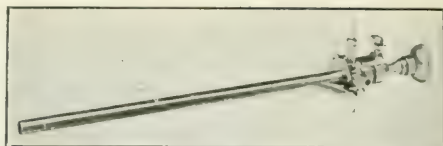


Fig. 9—Complete assemblage: sheath, light carrier and telescope; a, large catheter outlet to which suitable rubber cap or tip must be attached.

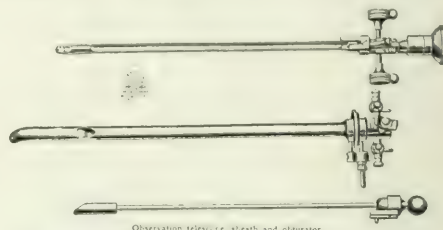


Fig. 10—Observation cysto-urethroscope.

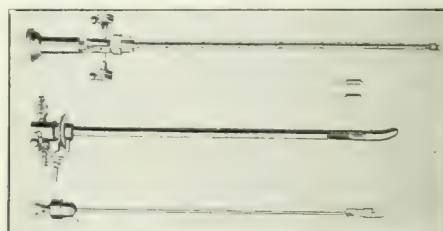


Fig. 11—Operating cysto-urethroscope.

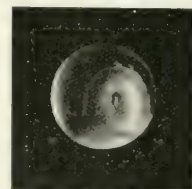


Fig. 12—Small verumontanum as seen with the indirect cysto-urethroscope, showing the small verumontanum, the urethra, and the verumontanum.



Fig. 13—Edematous and cystic lesions behind the verumontanum, as seen with the indirect cysto-urethroscope.

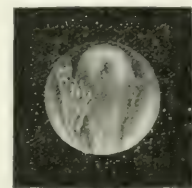


Fig. 14—Normal verumontanum with a small papilloma arising from near its base, as seen with the indirect cysto-urethroscope.

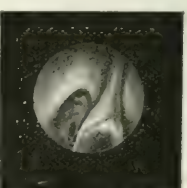


Fig. 15—Distorted verumontanum with large cicatrix in one of the sulci laterales representing old inflammatory focus in the prostate.

Theoretically, a simple endoscopic tube with direct illumination by means of a Valentine lamp, should suffice for such an examination from the urethral side. But experience has taught us that the telescopic instruments with water dilatation are far superior. For the purpose, therefore, of examining the posterior urethra and neck of the bladder, in what I may term the anterior or distal vertical plane (i. e., in vertical plane viewed from the urethral side), I have been employing an instrument which in certain respects is similar to the Geiringer instrument, but which possesses so many new features in its optical and mechanical construction, and so many new fields of therapeutic application, that I may be permitted to describe it in detail.

Fig. 3 illustrates diagrammatically how such an irrigation instrument brings into view the neck of the bladder and posterior urethra in the anterior or distal vertical plane, although the collapsibility of the urethra, and the dilating effects of the inflowing fluid are not depicted.

Finally, there remains the third method of viewing the neck of the bladder, but in the posterior or distal side or aspect of the vertical plane, namely, by means of the well-known retrograde cystoscopic method (Fig. 4). This method has been but little employed, partly because the optical and mechanical problems entailed have not yet been completely solved, and partly because the views obtained with it are modified by the fact that the sheath of the instrument must lie within the sphincter. The sphincter, in functional activity, therefore, cannot be properly viewed, because it is occupied, and, therefore, is functionally disturbed by the presence of a rigid metallic bar, namely, the sheath of the instrument.

It is but the first two methods, the indirect, telescopic or prismatic cysto-urethroscope, and the direct, non-prismatic telescopic urethroscope or cysto-urethroscope, that I shall discuss, leaving my work with the third method to be published at some future time. Since the features of the cysto-urethroscope are well known, I shall but briefly refer to my two models, namely, the observation cysto-urethroscope, and the operating cysto-urethroscope, shall describe in greater detail the instrument which may be called a "Universal Cysto-Urethroscope," and finally shall discuss the application of these instruments, particularly in the territory of the posterior urethra and neck of the bladder.

The Universal Cysto-Urethroscope. Although a large number of urethroscopes have been devised, for each of which claims of superiority over all others are put forth by their various inventors, it

has seemed to me, in the courses of studies on diseases of the urethra, that one fruitful field for the exercise of therapeutic endeavors through a modern urethroscope had been overlooked, namely, the treatment of filiform strictures of the urethra. It was for the purpose of visualizing the orifice of filiform strictures and for the introducing of filiform bougies under the control of the eye, that a new and useful urethroscope was devised. This was finally developed into a sort of universal cysto-urethroscope, an instrument with a wide field of utility, embodying in its construction features of the simple endoscope, the Goldschmidt, Brown and Geiringer instruments, modified in such a way as to give it a wide sphere of utility.

Description of the Instrument. The urethroscope consists of a straight endoscopic tube (Fig. 5), two obturators, a light carrier (Fig. 6), a telescope (Fig. 7) and a magnifying window (Fig. 8a).

The straight tube is longer than that of the ordinary urethroscope (7 1/4 inches) so as to be available for work in the bladder as well as in the urethra. Near the ocular end (Fig. 5), a large catheter outlet, of the type used in the author's operating cystoscope, is fused into the tube. Through this, special operating devices, such as rongeur forceps, fulguration electrode, filiform and larger bougies, catheters and applicators may be passed. Since the direction of this outlet, and therefore, the exit of entering devices is downward, the operator can manipulate more satisfactorily through it than through a straight endoscopic tube, vision being undisturbed by an intervening hand or instrument.

The endoscopic tube is reinforced at the ocular end by a flange, and admits the light carrier with a water-tight joint.

Two faucets also fit into the cuff. These give entry and exit to fluid for the distention of the urethra, making for an improvement in the clarity of the visual field, and for better manipulation of the instrument.

The obturators are designed either for work in the anterior urethra or in the posterior urethra and bladder. An obturator with a short, blunt conical extremity serves for work in the anterior urethra. The short obturator must be chosen for the cases in which we desire to treat filiform strictures of the urethra, lesions in the anterior urethra, or when we wish to remove foreign bodies from the anterior or bulbo-membranous urethra. The curved beaked obturator is to be selected whenever the instrument is to be inserted into the bladder.

The light carrier differs materially in its construc-

tion from any other previously designed, in that it is composed of a sector of a thin tube that fits tightly against the inner wall of the endoscopic sheath, and bears the irrigating tubule. It is equipped with a delicate lamp, which extends be-

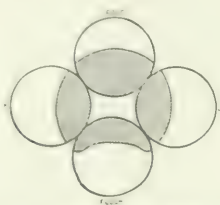


Fig. 16—The light carrier, as seen at the neck of the bladder. At the neck and sides a concave line is seen, a slightly convex line at the floor of the sphincter.

yond the carrier, being of such length that its rays can emerge and illuminate the usual endoscopic field. This type of light carrier possesses advan-



Fig. 17—the concave appearance of the sphincter margin.

Fig. 18—Shows the slight convexity normally seen at the floor of the sphincter as viewed with the indirect type of cysto-urethroscope.

tages over the usual forms, particularly in that its rigidity tends to maintain it in close apposition with the sheath.

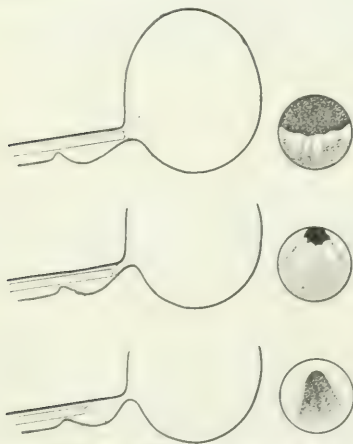


Fig. 19—The indirect type of cysto-urethroscope at the sphincter; 1—still farther into the supramontane urethra; 2—still farther in the region behind the verumontanum.

At the proximal end of the light carrier is the cuff (Fig. 6a) for the attachment of the electric contact (Fig. 6b) and its joint for the introduction of either the telescope (Fig. 7) or the magnifying window (Fig. 8a).

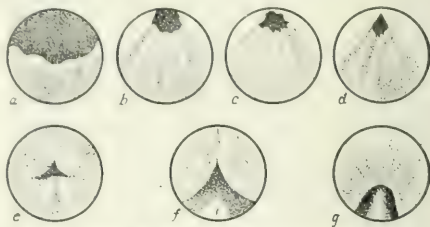


Fig. 20—Views of the vesical sphincter, and posterior urethra with the direct cysto-urethroscope.

a, b, c, d—show how little of the superior margin of the sphincter is seen in this view; f, g—show the verumontanum; at f, the summit; at g, the acclive.

Occupying one of the furrows at the side of the lamp tube is a fine tube, or tubule (Fig. 6d) that has its inlet at the faucet (Fig. 6e) and allows the irrigating fluid to escape at the objective end of the

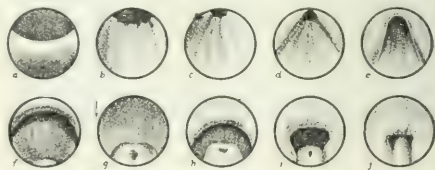


Fig. 21—Views of the sphincteric margin and posterior urethra with the direct cysto-urethroscope.

apparatus. Only in this way is it possible to obtain adequate cleansing of the urethral field when the instrument lies beyond the internal sphincter. When

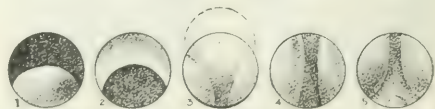
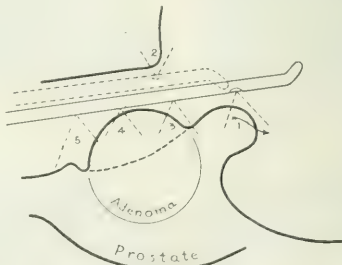


Fig. 22—Diagrammatic view of the indirect cysto-urethroscope riding on the middle and lateral lobe in cases of prostatic adenoma. The pictures at the situations seen in the upper figure being represented in circles below.

the urethroscope enters the bladder, irrigation may be effected without recourse to this irrigating tubule. The normal flow of fluid with the instrument in the urethra, then, is a current that begins at the far, or objective, end of the instrument and flows back and out through the second faucet at the ocular or proximal end.

The telescope. This is of the direct, non-prismatic, forward vision type, and its lens system is so designed that a sufficiently wide visual angle offers a view of operating instruments soon after they emerge from the sheath. It is held in a truncated conical fitting that locks into the cuff receptacle of the light carrier tube. However, it is not rigidly held, except when the washer screw is tightly secured (Fig. 7c), a forward and backward movement being permitted when the screw is loosened. This retrograde movement of the telescope is provided for the contingency which arises when operative devices are thrust through the sheath and a better view of their working end is desired. It will be found that a considerable portion of an operative instrument must needs be exposed beyond the sheath for a good view. If we pull back the telescope, however, we may work the jaws of the operating device at a short distance from the tube, sacrificing merely a small portion of the field thereby, but in no way impairing the utility of the visual instrument.

The Magnifying Window. In order to convert the telescopic instrument into an air-inflating instrument, or an Elsner-Braasch cystoscope (Fig. 8), or into an ordinary straight tube urethroscope, a magnifying window is provided, which serves, not only to close the tube for air inflation or water distention, but also magnifies the direct picture slightly, and obviates the necessity for accommodation of the eye at so close a distance. Thus, if we withdraw the telescope and attach the magnifying window, we may see the ureters according to the Elsner method, and examine the urethra by the same method, or, we may mop out the sheath, aspirate the contents of the urethra through the tubule (Fig. 6d) and inspect or treat according to either the air inflation or simple open air method.

In short, the instrument is *universal* in that it combines the uses of the following:

- (1) An open air anterior urethroscope and posterior urethroscope.
- (2) An air inflation anterior and posterior urethroscope.
- (3) A direct telescopic cystoscope (to replace the Brown).
- (4) A direct telescopic operating cystoscope.

(5) An operating, irrigating anterior and posterior or non-prismatic telescopic urethroscope.

(6) An Elsner-Braasch urethroscope and cystoscope.

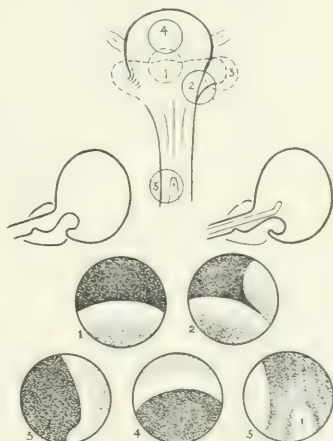


Fig. 23—The indirect cysto-urethroscope, in some cases of middle lobe adenoma, the circles represented below corresponding to the situation of the instrument in the upper diagram.

(7) A Kelly or Luy's endoscope and cystoscope.

Technic with the Irrigating Instrument. This universal cysto-urethroscope is chiefly recommend-

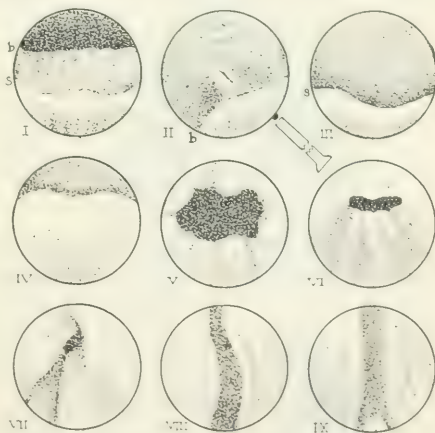


Fig. 24—Pictures with the direct cysto-urethroscope in the case of contracture of the neck and median bar formation.

I-Is, the bar;

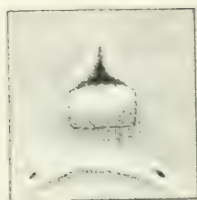
II-b, bar having retracted;

III, sphincter;

VIII-IX, fibrotic lateral walls.

ed as an irrigating telescopic instrument for the neck of the bladder, posterior and anterior urethra. The technic of its use is as follows:

The sheath fitted with the curved obturator is in-



a



b



c



d

Fig. 25.—Direct cystourethroscope view of the neck of the bladder and internal sphincter.

b—a sagittal section of the bladder at the neck.

c, d—circular views of the bladder neck, showing the internal sphincter as a small, dark, conical structure protruding from the bladder neck.

troduced into the bladder (Fig. 5), the obturator removed, and the bladder irrigated if necessary. The light carrier (Fig. 6) and telescope (Fig. 7) are now locked in place (Fig. 9), and the irrigating fluid allowed to flow through one of the faucets

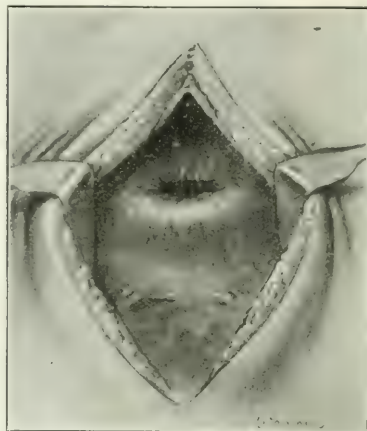
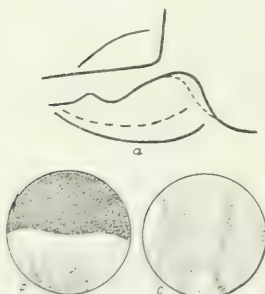
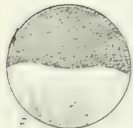


Fig. 28.—The telescope, in place, at the neck of the bladder, the opening of the sphincter being practically closed by it.

(Fig. 6e), a rubber tip or cap having been adjusted at (Fig. 8) the catheter outlet. The trigone, ureters, bas-fond, and the posterior wall of the bladder



a



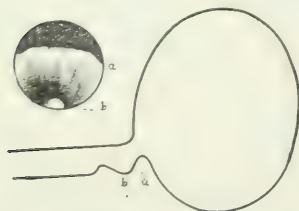
b



c

Fig. 26.—a—sagittal section of a case of diffuse prostatic fibrosis, showing the general enlargement of the sphincteric region.

b, c—show the absence of suggestive findings in the urethra.



a

b

c

Fig. 27.—Diagram representing a short suprapontane urethra with a sphincter transverse loop (a-b), shown in the circle with the indirect cystourethroscope.

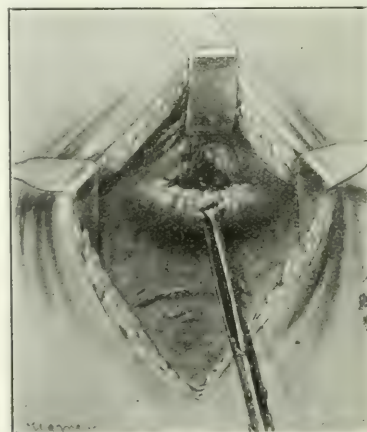


Fig. 29.—The bar is pulled away by means of a fixation forceps, showing the orifice of the internal sphincter.

may be adequately illuminated and brought into view, and we may then proceed with the examination of the neck of the bladder and urethra.

For those who employ the direct cystoscopy

method by preference, both ureters may be catheterized according to the well-known principles of manipulating non-prismatic cystoscopes.

When the neck of the bladder and urethra are to be examined with the water flowing, the instrument is slowly withdrawn, a periscopic view of the urethra being obtained, the supramontane, membranous montane, bulbous and anterior urethra successively appearing. As soon as the membranous urethra is brought into view, it is well to grasp the penis with the left hand, while the right hand manipulates the cysto-urethroscope, in order to prevent reflux of the irrigating fluid, the amount of dilatation of the urethra being controlled both by the height of the irrigator, and the patency of the irrigating faucet.

As a Catheterizing Cystoscope. Although the universal urethroscope is not primarily intended for urethral catheterization, it may be occasionally used for this purpose, and two No. 6 French catheters may be introduced during the course of other work with this instrument, should the necessity of obtaining specimens from the ureters arise. The technic is the same as that with the direct non-prismatic type of cystoscope (Brown), and the instrument may, therefore, appeal to those who are in the habit of employing the direct method of catheterization. After specimens have been obtained, the catheters may be withdrawn, a closed rubber tip attached to the catheter outlet, and the instrument may then be used as a urethroscope.

For those who are in the habit of employing the Kelly or Luys methods, this instrument may be converted into a Kelly or Luys' endoscope; or, into an irrigating cystoscope of the direct non-prismatic type. By removing the telescope and inserting the magnifying window (Fig. 8a), the universal urethroscope may at once serve as an Elsner-Braasch cystoscope, possessing distinct advantages over the latter in that it will permit of the introduction of one large catheter, and of operating devices.

As an Operating Cystoscope. Although the instrument will not supersede the author's operating cystoscope for special operative work in the bladder, it may be preferred as an operating cystoscope by those who are experienced in the Kelly and Elsner-Braasch methods, since the technic of its application will be found easy to master by such workers. With the instrument introduced in the usual fashion and the bladder washed out, observation cystoscopy is first carried out, a foreign body is viewed, or a ureter put into the field, or a tumor or ulcer inspected, as the case may be.

To fulgurate, a properly selected tip is adjusted

to the catheter outlet and the special applicator or wire introduced, just as in the author's operating cystoscope, it being remembered that the absence of a catheter deflector necessitates working at close range to obtain a precise application of the electrode against the tumor.

As a Posterior Urethroscope. In routine examinations the author's indirect cysto-urethroscope

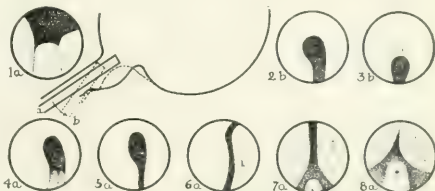


FIG. 30. Diagram depicting (a) the defect in the floor of the sphincter after the Buerger operation, for constriction of the neck of the bladder, and the cradle motion acquired in the posterior urethra after such operation; (2-b and 3-b) the views obtained when the instrument is moved in such cradle fashion; (4-a), the relatively large amount of the lateral borders of the sphincter that is seen in such a case of acquired organic relaxation of the sphincter.

possesses distinct advantages over the universal, in that it is not so likely to cause traumatism. Furthermore, the Buerger cysto-urethroscope may be moved backward and forward and pushed inward and outward frequently during the examina-

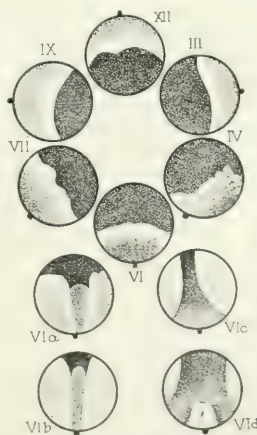


FIG. 34. The same case as FIG. 30 seen with the indirect cysto-urethroscope—the Roman numerals indicating the position of the instrument in terms of the face of the clock.

tion, without incurring the risk of producing hemorrhage, making a more thorough examination possible, even in difficult cases, in which the universal cysto-urethroscope would be less satisfactory. However, the value of the universal cysto-urethroscope, i. e., the direct telescopic type of vision in the ure-

thra, should not be underestimated, there being a distinct field of application for this method of examination.

Kelly's Large Endoscope. Certain advantages are offered by the instrument in the presence of the large catheter outlet through which catheters or other devices may be introduced. For those who limit their work to the female urinary tract, the length of the instrument may be reduced from 7 1/4 inches to 6 1/2 or 6 1/4 inches. The possibility of maintaining a dry field by aspiration through the tubule (Fig. 6) at the faucet (Fig. 6e) obviates the necessity of introducing Kelly's special aspiration device.

As for its uses as an air inflation urethroscope or Elsner-Braasch cystoscope (Fig. 8), enough has been said to indicate that it may be so employed, although we ourselves do not find any necessity for invoking the use of these methods.

The Application of the Two Types of Cysto-Urethroscope. In a general way, we may say that in the posterior urethra the indirect prismatic cysto-urethroscope possesses certain advantages over all other instruments in the study of detail. Because of the absence of distortion, it is ideal for the investigation of the finer structural changes in the urethra. The observation cysto-urethroscope (Fig. 10) prevents prolapse of the mucous membrane into the fenestra effectually, and therefore, the images are much more nearly perfect than those obtained with the operating cysto-urethroscope (Fig. 11), or with convex sheath of the cystoscope. If the cystoscopist does not seek to obtain ideal conditions, his work must needs be superficial, because, when details are lost, the keen judgment that is born of exact interpretation, is bound to be missing. For therapeutic work, for the application of the high frequency electrode, and for occasional opening of the prostatic ducts, or the utricle, the operating cysto-urethroscope is preferable. Furthermore, because of the fact that the mucous membrane is stretched, as it were, in planes parallel to the instrument, and kept at a considerable distance from the lens system by water dilation, it is possible to view with greatest accuracy every detail of the mucous membrane, and the slightest abnormality can be detected. The pictures obtained by this indirect cysto-urethroscope are far more beautiful and far more instructive than any that can be obtained by the direct telescopic system.

The four illustrations (Figs. 12, 13, 14 and 15) show what excellent detail may be expected in the posterior urethra.

At the neck of the bladder the pictures with the

indirect cysto-urethroscope are typical. There is usually a concave line at the roof, and at the sides, as seen in Fig. 16. The illustrations Fig. 17 and 18 show the usual appearance of the side walls and the floor of the sphincter. It should be noted that all these four regions come equally well into view, the floor of the sphincter appearing just as we draw out the instrument from the bladder into the urethra. This circumstance is worthy of careful consideration, since we will show later, that the direct type of instrument shows but little of the roof of the sphincteric region.

When we come to compare the picture of the posterior urethra and neck of the bladder as viewed with the direct telescopic cysto-urethroscope, and those just described, we will note that with the former a periscope or panoramic view is obtained

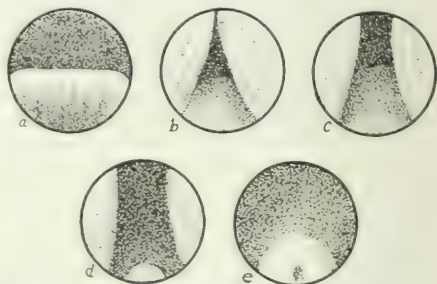


FIG. 16. a, b, c, d, e, views of the posterior urethra and neck of the bladder as viewed with the direct telescopic cysto-urethroscope. a, b, c, show the floor of the sphincter; d, e, show the recession of the floor of the sphincter.

in planes at right angles to the shaft of the instrument. Distortion must necessarily be expected, partly because of the prolapses of the mucous membrane just beyond the objective end of the tube, and partly because of the nature of the lens system. In interpreting the pictures, therefore, due allowance must be made for prolapse of mucous membrane and for the muscular closure of sphincteric and prostatic regions at points just beyond the sheath.

Thus if we study the pictures of the neck of the bladder and posterior urethra with the direct type of the urethroscope (the author's Universal Cysto-urethroscope), we will find (Fig. 19) that when the instrument is at the neck of the bladder, the floor alone comes into view, and instead of the normal convex line seen with the cysto-urethroscope, a concavity is the rule. As we pull out the instrument into the second position in the supramontane urethra, the floor of the sphincter naturally ascends or the sphincter tends to close, so that the sphincteric orifice is seen to rise higher in the field, and still

little or no roof of the sphincter is drawn into view. In the third picture (Fig. 19) with the instrument still farther in the urethra, the floor of the urethra will be seen as a trough, or depression, the lateral walls and roof closing in a horse-shoe fashion over the depressed area.

Figs 20 and 21 show diagrammatically the appearances in two other cases. Fig. 20 again demonstrates how little of the roof of the sphincter and lateral walls come into view, how much longer, apparently, the floor of the sphincter in the supramontanum region is, than the roof and side walls, and further would also show the relation of the verumontanum to the roof and side walls of the urethra in pictures 20f and g. We must not be confused by pictures that simulate the lateral intrusions of adenomas of the prostate, when we see rounded bodies jutting in from lateral positions into the urethra and encroaching upon the verumontanum (Fig. 20f).

Fig. 21 (f, g, h, i) show the relation of the verumontanum to the surrounding portions of the urethra, indicating also the difficulty in bringing into view the posterior portion of the verumontanum, and showing how it seems to lie at the bottom of a tunnel, formed by the roof and side walls of the urethra.

When we study these views we can readily understand the value of comparative investigations with the two instruments. It will also be clear now that each instrument has its special sphere of utility in those two most difficult and interesting diagnostic fields, which I shall now describe, namely, first in *obstructive lesions*, and second in *paretic or paralytic conditions of the sphincter*.

The Obstructive Lesions at the Sphincter and Their Diagnosis. I can barely touch upon the visual diagnosis of the lesions of the posterior urethra and sphincter to-night, for time does not permit me to go extensively into this most interesting subject. Let us divide the obstructive lesions into a first group including the so-called "prostatic hypertrophies" or to be more exact adenomas (leaving out of discussion the carcinomas of the prostate, bladder tumors, foreign bodies, or calculi), and a second group, the *contractures of the neck of the bladder*, including here the so-called *median bars*.

An exhaustive discussion of the diagnosis of prostatic adenoma with the use of the optical instruments would take an evening alone, and I can simply refer to a few points that will help understand the comparative utility of the two telescopic instruments.

The cysto-urethroscope is par excellence, the best

instrument in this field of diagnosis, because it gives us a fairly accurate conception both as to the size of the adenomas, their situation, their direction of growth both in the urethra and in the sphincteric region.

I may be permitted to illustrate with a diagram which displays the situation of the indirect cysto-urethroscope, and its relation to the middle and lateral lobe adenomata in so-called prostatic hypertrophy (Fig. 22).

In this diagram the cysto-urethroscope is shown riding on the lateral lobe adenomata and on the middle lobe, elevated by these into a position which brings it closer to the superior wall of the urethra than to the floor. When the fenestra is opposite the point 1 in the Fig 22, the middle lobe is seen as in the small circle represented below. Depending upon the shape of the middle lobe and its intrusions in the sagittal sense, that is, towards the bladder, will variations in the picture be noted. When the instrument is turned towards the roof, at point 2, we may get a normal concavity or slight incisures, unless the lobes have become so large that the typical sharp V is formed. As we pull out the instrument to the point 3, the two lateral lobes begin to appear separating above and approaching below. At point 4 the two lateral lobes or adenomata appear like two vocal chords separated by a deep cleft which may be dark, because of the inadequacy of illumination, demonstrating how far from the floor the urethroscope really lies. At the point 5, the two lobes begin to separate again in the form of an inverted V, the verumontanum appearing below, very diminutive, as a rule, its size being inversely proportionate to the size of the adenomata. The greater the size of the adenomas, the farther away from the floor the instrument usually is situated, and the smaller the verumontanum.

Most difficult, however, is it, even with this instrument, to accurately estimate the size of the lesions at the sphincter when they are kept forcibly in close proximity with the fenestra of the instrument. Thus, tiny nodules, surrounded by edematous mucous membrane may simulate middle lobes of considerable size, incisures at the neck—always an indication of adenoma formation when they are between two shining rounded bodies—i. e., incisures may suggest adenoma when we are in reality dealing with a fibrotic condition, whilst, on the other hand, intrinsic enlargements of the prostate of considerable size may give practically no evidences of their presence in the urethra.

Fig. 23 will demonstrate beautifully how a very large middle lobe may, if supple and displaceable by

the instrument, appear to be rather small. Most suggestive, however, and usually diagnostic, is a deep incisure, be it laterally placed or at the roof of the sphincter, in the diagnosis not only of middle lobes, but also of lateral adenomata.

Fig. 23 depicts a fairly large soft middle lobe adenoma which was demonstrated by comparison of the cystoscopic findings and findings at operation to have been definitely displaced downward by the pressure of the instrument, so that it appeared in the picture much smaller than it really was, having been bent upon itself, the true amount of intravesical intrusions having escaped observation through the instrument. The dotted line in the upper figure illustrates the position of the sphincter, the adenoma meeting the vesical neck at the point 2 in the form of a deep incisure, and on the other side fusing with the surrounding parts in a concave line. With the instrument at point 1, and a greater portion of the lobe pressed downward, the picture seen in the circle below was obtained. At the point 3 the typical incisure so characteristic of adenomata was found, at 3 and 4 (4 being the roof of the sphincter) nothing abnormal, and at 5 but a slight indication of lateral lobe formation.

In short, these pictures apprised us, firstly, of the inadequacy of even the best of instruments in correctly estimating intrusions in the region of the sphincter, and, secondly, suggest the importance of lateral incisures in the recognition of the presence of adenomata.

The direct telescopic method or universal cystourethroscope is of but limited value in the advanced cases of adenoma, but may give us some valuable information of early intraurethral changes, in that it may permit us to differentiate very nicely between rigid lateral adenomata in the posterior urethra, and between those doubtful pictures of lobes that are simulated by prolapsing mucous membrane. In the former, the rule is to see rigid protruding lateral bodies over which the mucous membrane is not displaceable, is thin, glistening and covered with vessels; in the latter (which may occur in suspected paralytic cases), the mucous membrane has a tendency to fold, may be redundant, is easily displaceable and velvety.

Contracture of the neck of the bladder. In the cases of contracture of the bladder both the indirect and the direct cysto-urethroscope can give valuable information, though it must be emphasized that there are cases which may not be cleared up by the use of either of these instruments, either because the lesions present no intravesical intrusions recognizable through the telescope, or because the patho-

logical changes are of a diffuse variety involving the eccentric portions of the sphincter and prostate, without surface alterations. Theoretically, the two best methods of diagnosis are the visual method, which sees the sphincter from the vesical side, such as the view obtained at suprapubic cystotomy, and secondly, the palpatory method, with the use of the finger, which alone can estimate correctly the amount of induration, dilatability, and contracture of the sphincter ring. If we divide the cases as they have presented themselves to me clinically and pathologically into the following five groups, we will see that it is essential to subject them to careful inspection with both instruments before a definite

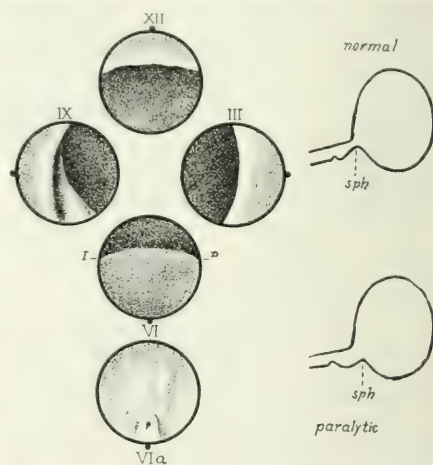


FIG. 22.—on the left, the views obtained with the indirect cystourethroscope in a case of the paralysis of the sphincteric region, on the right a sagittal section of the normal and paralytic sphincter and bladder.

estimation of the juxta-sphincteric changes can be obtained.

Thus, we may have to deal with any of the following varieties:—the mixed cases, where small precocious adenomas are present in young men, together with more or less fibrous contracture of the sphincter region, with or without distinct bar formation. Second, a distinct bar transversely situated in the region of the inferior margin of the sphincter. Third, the subcervical and subtrigonal adenomas. Fourth, the fibrous changes of the sphincteric region with extensive fibrosis and enlargement of the prostate, without any true adenoma. Fifth, fibrosis of the lateral and anterior margins of the sphincter without involvement of the floor.

The direct telescopic cysto-urethroscope will be found exceedingly valuable in bringing to view the

rigidity of the sphincteric margin, its lack of dilatability, the short distance between the trigone and sphincter, and perhaps any intra-vesical intrusion in the region of the so-called median bar formation. It is less valuable, on the one hand, than the indirect cysto-urethroscope in the study of the lateral margins and the superior wall of the sphincter, these being almost invisible through the direct instrument. On the other hand, it gives exceedingly valuable information regarding the rigidity of the lateral walls of the prostatic urethra, which by reason of the inflowing water, can be easily recognized as being either relaxed or fibrotic.

Fig. 24 shows the changes in a case of contracture of the neck of the bladder, where there was a distinct median bar. Between the region marked b-s (s representing the sphincter) (Fig 24-I) there was a distinct elevation, which at operation was demonstrated to be a median bar. Fig. 24-II shows the short distance between the bar and urethral opening. The other figures show a urethra approaching the normal, except for the Figures 24-VIII and IX, which show redundancy of the lateral walls in the region of the posterior urethra. This condition, however, can be distinctly differentiated from adenoma by the supple and displaceable nature of the mucous membrane.

In another case of contracture of the neck of the bladder the direct telescopic instrument demonstrated beautifully the shortened trigone (Fig. 25c), the prominent sphincter, the findings being corroborated at operation.

Figure 25a depicts the fibrotic inferior margin of the sphincter found at operation, the dotted lines indicating the region excised in the operation, which I perform and recommend for this condition. Fig. 25b shows a diagrammatic sagittal section of such a bladder, and illustrates also a prominent mucous lip found in this case, limiting the bar behind, but not being responsible, in my opinion, for the obstructive condition encountered. Fig. 25c represents the bar, the shortened trigone and the trabeculated bladder, and Fig. 25d offers nothing particularly striking, being a view with the direct cysto-urethroscope, which revealed nothing suggestive in the posterior urethra, other than a somewhat elonged supramontane urethra.

In another type of fibrosis of the prostate, which clinically and anatomically produces the same rigidity of the sphincter, that we find in true contracture of the neck of the bladder, but where the lesions occupy or involve the whole of the prostate, the findings may be practically nil (Fig. 26). For, in this type, the whole sphincteric region and the tri-

gone behind it, will be found at operation to be raised up in mound-like fashion by virtue of the increased size of the prostate, and although no bar is present, all the contiguous structures are fibrotic, undoubtedly due to a chronic inflammatory process. Such cases may be mistaken, even at the operating table, for carcinoma, and, clinically, when they occur in men of advanced years, may be regarded as carcinomas, particularly since the prostate feels very much indurated per rectum. Neither the direct nor indirect cysto-urethroscope give very much information in such cases, as the figures show. Nor would we expect much light, for the reason that no definite bar is present, and no intrusion, other than a general mound-like elevation.

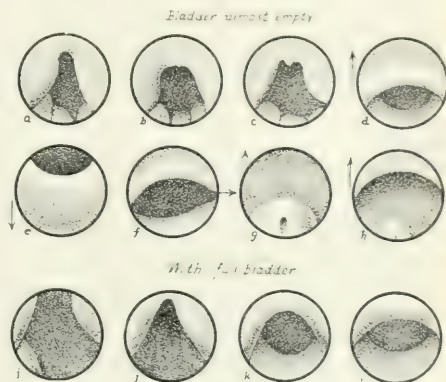


Fig. 34.—Above eight views (a-h) with the direct cysto-urethroscope, seen in case depicted in Fig. 33; below (i-j) the same case when the bladder was full.

a, b, c show the relaxed floor of the sphincter;

d, e, f, g, h—show the abnormal increased mobility of the instrument, the arrow indicating the direction taken by the objective end of the instrument; in f, the instrument is midway between positions d and e. In i and j, the floor of the sphincter has entirely disappeared.

Finally, I shall demonstrate a not uncommon form of short supramontane urethra, which can give the clinical symptoms of contracture of the neck of the bladder, but of whose pathology I know very little, since I have never had the opportunity of inspecting the neck of the bladder through the opened bladder in such a case (Fig. 27).

It may be well before going to the subject of the paralytic sphincters to dwell in short compass on the changes that can be demonstrated in the region of the sphincter, weeks or months after the operation, which I perform for contracture of the neck of the bladder, because the utility of the direct cysto-urethroscope in differential diagnosis between operative or artificial organic insufficiency of the floor of the sphincter, and paralytic insufficiency of the same re-

gion thereby, will be elucidated. Figure 28 will illustrate the prominent bar that we sometimes see in cases of contracture of the neck of the bladder, showing how the sphincter may be closed by such an overhang. In the next illustration (Fig. 29) the sphincter is seen to be open as the bar was pulled back by the fixation forceps at operation. Now, when this region is excised with a knife in clean-cut fashion through the suprapubic route, we subsequently get perfect restoration of the region, as far as the integrity of the mucous membrane is concerned, and amelioration of the symptoms in about 75% of the cases. If we examine such cases after an excision of the floor of the sphincter has been performed, and after the parts have already healed, we will obtain the pictures now to be shown. In Fig. 30 we will see that there were definite evidences of an absence of a sphincteric floor at the site of excision (1a). In addition to this, the instrument will be found to attain, by virtue of the dilation of this region, a certain increased degree of mobility over what we regard as normal. So that when the instrument is pulled out somewhat, pictures 2b and 3b may be obtained, showing varying amounts of the roof of the urethra, pictures that can only be produced when a cradle motion of the urethroscope is permitted. Such a degree of mobility is not normal. Elsewhere in the urethra there is nothing particularly abnormal, except for the fact that the lateral walls are somewhat more rigid than they normally are, and appear in 7a and 8a as lateral lobes, and may be confused with lateral adenoma.

In short, application of the instrument is valuable here first, in demonstrating a defect in the floor of the sphincter; second, in the recognition of the phenomenon of an acquired increased mobility of the objective end of the sheath—this being a circumstance, the significance of which must be differentiated from a similar condition occurring in the relaxed and paralytic sphincters.

If we now examine the same case with the indirect cysto-urethroscope (Fig. 31), we will find that somewhat less information is obtained in the region of the sphincter, but in the supramontane urethra, the excavation can be well demonstrated, and the rigidity of the lobes also just above, and on either side of the verumontanum.

Paralytic conditions of the sphincter. Indirect and direct cysto-urethroscope are both valuable in a study of conditions of relaxation of the sphincteric region, the direct telescopic method giving possibly more information than the indirect, in that we have at our disposal a means of estimating the *functional activity of the sphincter*. When the function of

the sphincter is partly in abeyance, when it is relaxed, as it were, it is possible to dilate it much more easily than in the normal by means of the irrigating fluid. The examining instrument acquires greater ease of motion in the urethra, and can often be pushed backwards and forwards without causing bleeding and without meeting any resistance at the sphincter. This circumstance alone may be regarded as indicative of sphincteric relaxation.

We may distinguish between the mild or early stages of sphincteric relaxation, or the well-developed stage, in which the floor of the sphincter has lost its tone completely, and retracts so that the internal sphincteric orifice opens in a funnel-shaped fashion into the bladder.

Not only is the direct type of cysto-urethroscope of great value in cases of mild relaxation of the sphincteric region, when it can be definitely shown to have acquired greater ease of motion, in a to and fro sense, but particularly is it valuable, when it shows that the floor of the sphincter has definitely retracted, as shown in a case from which the Fig. 32 was drawn. Here we see in Fig. 32b, c, d that the floor of the sphincter is dark a good distance from the field of vision, undoubtedly relaxed. Whereas much more of the lateral aspect of the sphincter comes into view, than in the normal cases. The relaxation in the region just behind the verumontanum is also seen (Fig. 32b).

Where the paralytic condition of the sphincter is well developed, the cysto-urethroscope of the indirect type may give valuable information, as seen in Fig. 33.

On the right a sagittal section of the bladder, and sphincteric region, with the normal and the Paralytic sphincter compared are depicted. On the left the pictures with the indirect cysto-urethroscope are shown, the floor of the sphincter being practically absent, and seen lying far away from the instrument, at the level (I.B.), where it has the appearance of an interureteric bar, and not the prominence of the normal floor of the sphincter. Between the level (I.B.) and the verumontanum, there is quite a pouch, which is the tunnel into which the posterior urethra and neck of the bladder have been converted.

If we compare these pictures with the views obtained with the direct cysto-urethroscope in the same case (Fig. 34), we will note that when the bladder is only moderately full or almost empty, that the floor of the bladder with the direct type of instrument, shows relaxation, often plication, as in Fig. 34a, b, c. We will also see, that the roof and side walls come into view, which is distinctly ab-

normal for this type of instrument. It indicates that since the floor of the sphincter has receded, the mouth of the urethra has widened, that the instrument can get a view of the roof and sides, the floor lying at a distance and poorly illuminated.

A still more valuable phenomenon, demonstrable in such cases of paralytic sphincter, is the acquired increased mobility of the instrument, both at the sphincter and in the posterior urethra; so that when we move the ocular of the instrument downward, the objective moving up towards the roof of the urethra, Fig. 34c is obtained, showing below the relaxed sphincter, in the center the wide opening of the internal vesical orifice, and above the roof of the sphincteric margin. That the instrument can be moved also in the other direction is seen in Fig. 34e, as indicated by the arrow. In the mid position (Fig. 34f) the abnormally large outlet of the bladder is seen. Similarly, in the region of the verumontanum, increased mobility of the instrument can be readily demonstrated.

Even more striking are the pictures, when the bladder is full, when it can be shown as in Fig. 24a, b, that practically none of the floor of the sphincter comes into view, and only the side walls are viewed, and that it is not until we enter the urethra, and approach the region of the fossula prostatica, just behind the verumontanum, that the floor of the urethra comes into the field.

In short, characteristic, for the paralytic and relaxed conditions are—1, the increased ease of motion in the direct cysto-urethroscope in a to and fro sense (motion of translation); 2, the absence of traumatism, even when a very slight amount of irrigating fluid is allowed to flow through; 3, the retraction or disappearance of the floor of the sphincter, with an increased amount of roof and side walls in the picture; and, 4, the increased mobility of the instrument moved in a cradle fashion in the neck of the bladder and posterior urethra. All these facts demonstrate a dilatation, or at least, a muscular insufficiency of both sphincter and region of the posterior urethra.

AUTOMOBILE ACCIDENTS.

Vital statisticians are observing that while the communicable diseases have responded more and more each year to the measures instituted by health authorities for their control, injuries and fatalities resulting from the growing use of automobiles are steadily climbing. Where formerly diseases like typhoid fever, scarlet fever and others played an important rôle in mortality tabulations, fatalities due to the automobile are today as numerous as some of the serious infections.—L. FRANKEL, in *Medical Insurance and Health Conservation*.

DIAGNOSIS AND TREATMENT OF BRAIN INJURIES WITH OR WITHOUT FRACTURE OF THE SKULL*

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The mortality resulting from brain injuries is very high. During the period from 1900 to 1910, the mortality figures at three of the large hospitals in New York ranged from 46 to 68 per cent. of all cases of brain injuries. In a report recently published by *Dr. Besley of the Cook County Hospital of Chicago regarding 1,000 consecutive patients having fractures of the skull, the mortality was 53 per cent. This death rate is indeed appalling, and it undoubtedly accounts for the attitude of many doctors and most hospitals toward patients having fractures of the skull, particularly those of the base. If the patient recovers, remarkable—he had a fracture of the skull. If he dies—well, he had a fracture of the skull.

It is this attitude of comparative hopelessness in the treatment of brain injuries that has allowed these cases to be almost neglected in the general hospital. I well remember being severely reprimanded as a house officer for having admitted to the hospital from the ambulance a fracture of the base of the skull, and not having sent the patient to Bellevue Hospital. As a house surgeon, my instructions were to keep the beds free of fractures of the base of the skull, the reason being that so little apparently could be done for these conditions. The patients either improved after a long convalescence, or more frequently they died, the treatment other than the ordinary routine palliative procedures being of little or no benefit.

The belief has long been maintained that the patients with brain injuries, especially following fractures of the base of the skull, get along just as well without operation as with operation. This position is well taken if the patients requiring operation are not operated on until they reach the dangerous stage of medullary compression and even the later stage of medullary edema; then it matters very little whether the patient is operated on or not—in fact, what chance of recovery the patient may have is taken away by an operation at that late and dangerous period of medullary edema, the operation being just an added shock, so that death is usually hastened. The mortality from 1900 to 1910 was 87 per cent. following operation on patients who

* Read before the New York and New England Association of Railway Surgeons, November 8th, 1918.

* Besley, F. A.; A Contribution to the Subject of Skull Fractures. *The Journal A. M. A.*, Jan 29, 1916, p. 345.

showed signs of high medullary compression and edema. The patient, however, should not be allowed to reach that dangerous medullary stage. *It should be anticipated that repeated examinations and tests, and if the early signs of definite increase of the intracranial pressure appear, then the operation should be advised immediately.*

An early operation is advisable, not only as a means of saving the life of the patient, but also to lessen the danger of post traumatic conditions, so common after fractures of the skull. These conditions of nervous instability, such as marked depression, irritableness, persistent headache and even epilepsy following brain injury, especially as the result of basal fractures, are due in the majority of cases, I believe, to the resulting unrelieved increased intracranial pressure prolonged over a period of several weeks or more, and frequently resulting in the chronic edematous, swollen brains, so commonly observed at later operation on these patients. The cortical irritability may become so high as to allow epileptiform seizures to occur.

The diagnosis and treatment of brain injuries has advanced most rapidly within the last few years. The clinical symptoms and signs are so varied and frequently so confusing that it is a most interesting field; apparently in many cases the more extensive the fracture of the skull, the less seriously is the brain injured, and to the contrary, *the most dangerous brain injuries* frequently are not even associated with a fracture of the skull. As is well known the fracture in these cases (if we exclude depressed fractures of the vault which should always be elevated or removed) is possibly the most unimportant part to be considered in the treatment, whereas the presence of a marked increase of the *intracranial pressure* with or without a fracture of the skull should immediately cause the patient to be withdrawn from the large group of patients properly treated by the expectant palliative method, and the advisability of an early operative procedure to relieve the increased intracranial pressure should be considered.

During the three years 1913, 1914 and 1915*, I examined and treated personally 239 adult patients having acute brain injuries with or without a fracture of the skull; in only 79 of these 239 patients (that is, 34 per cent.) were there marked signs of an increased intracranial pressure, and therefore only these patients were operated upon to relieve this increased pressure, whereas the remaining 160 patients did not show definite signs of an increased intracranial pressure and were therefore treated by

the expectant palliative methods of absolute quiet, ice helmet and catharsis; if in shock, then the routine treatment of shock was administered. It is thus seen that only one-third of the patients having brain injuries with or without a fracture of the skull were operated upon, and approximately this same ratio has continued during the past year. The careful selection of patients, in regard to the advisability of an operation, the type of cranial operation used, the ideal time for performing the operation, are the factors that have made it possible to lower the mortality of fractures of the skull from the general average of 50 per cent. to 30.7 per cent. at the Poly-clinic Hospital. If we exclude the moribund patients, dying within three hours after admission to the hospital from shock, internal injuries, the fracture of the skull being but an incident in the patient's general condition, the mortality is lowered to only 19 per cent.

In the treatment of brain injuries with or without fractures of the skull, if the patient is allowed to develop definite paralyses, a lowered pulse-rate, Cheyne-Stokes respiration and the appalling signs of extreme intracranial pressure, I agree he will "get along" just as well without operation as with one—the mortality being 50 per cent. and over. Patients with brain injuries should not be allowed to reach this dangerous stage of medullary compression due to the high intracranial pressure, but it should be anticipated by accurate diagnostic methods. If a marked increase of intracranial pressure is ascertained, then an early relief of it should be advised, not only to save the life of the patient but to lessen the post-traumatic conditions of changed personality, either of the excitable or the depressed type, persistent headaches, early fatigue, occasional epilepsy and that long train of post traumatic conditions due in the majority of instances to a prolonged increase of this intracranial pressure.

Besides the lowered pulse and respiration rates, which are comparatively crude signs of intracranial pressure, and the irregular Cheyne-Stokes type, the latest signs of extreme intracranial pressure, with its resulting medullary compression, the two most valuable procedures for determining a definite increase of the intracranial pressure are the examinations of the fundi of the eyes with the ophthalmoscope and the measurement of the pressure of the cerebro-spinal fluid at lumbar puncture by means of the spinal mercurial manometer.

Although it is rare for a measurable papilloedema and "choked disks" to occur in these cases of traumatic intracranial lesions with or without a fracture of the skull, yet the earlier and therefore milder

degrees of an edema of the optic discs should be most carefully "watched for" with the ophthalmoscope as being one of the accurate signs of the presence of a definite increase of the intracranial pressure. The ophthalmoscope and especially the direct method is a most valuable means in the diagnosis of cranial lesions. Rarely do these fundal examinations reveal an increased intracranial pressure within six hours after the head injury; this is due to the presence of shock in these patients who later exhibit the marked signs of intracranial pressure. As head injuries are usually accompanied by shock of varying degrees, naturally the blood pressure is low so that even if a large intracranial vessel was torn, there could be only a comparatively small amount of hemorrhage because the resulting increased intracranial pressure would soon be greater than this lowered blood pressure of shock, and therefore the bleeding would cease. As the patient recovers from the condition of extreme shock, the blood pressure rises and then more bleeding can occur intracranially until the intracranial pressure again equals the lowered blood pressure. Finally, if the patient survives this condition of shock, then the blood pressure will be continuously greater than the intracranial pressure, so that this resulting increased intracranial pressure produces its characteristic signs in the fundus of the eye—a dilatation of the retinal veins, and an edematous blurring of the nasal halves, and if still higher, then an edematous obscuration of the temporal halves of the optic disks. A measurable papilloedema and "choked disks" occur only when the intracranial pressure is extreme, due to a large intracranial hemorrhage of slow formation, such as the extradural middle meningeal type—just as in brain tumors or when the ventricles are blocked producing an internal hydrocephalus. Naturally, if the intracranial hemorrhage forms very rapidly and is of large amount, the patient usually dies within a couple of hours so that "choked disks" have very little time to be produced. The shock following head injuries usually lasts for about six hours in the patients who survive and, therefore, it is rare within these first six hours for the ophthalmoscope to reveal definite signs of an increased intracranial pressure. It may be also noted that the patients who do not survive the condition of shock usually die within the first six hours. It is, therefore, of the greatest importance to recognize these early signs of increased intracranial pressure by repeated ophthalmoscopic examinations and to realize that these edematous blurrings of the optic disks are more than being merely within physiological limits. It is true that in cases of myopia there is normally an obscura-

tion of the disk outlines, but these patients can be excluded by the second and following test, which should always be performed.

The most accurate known means for ascertaining the presence or absence of an increased intracranial pressure is the measurement of the cerebro-spinal fluid at lumbar puncture by the spinal mercurial manometer. It is similar to a blood pressure apparatus, as safe as a lumbar puncture when properly performed, and by it the varying degrees of intracranial pressure can be carefully recorded. The normal pressure is 5-9 mm. of mercury, so that if a pressure higher than 15 mm. is obtained at lumbar puncture, then we know that the signs of intracranial pressure, as shown in the fundus of the eye, are confirmed. This method of estimating intracranial pressure is most important in the differentiation of the intracranial condition of spastic paralysis due to hemorrhage at birth from those other causes of the so-called Little's disease. In other intracranial conditions producing the extreme stages of papilloedema and "choked disks," and even their end results of secondary optic atrophy, as in neglected cases of brain tumor, it is not necessary to confirm the ophthalmoscopic findings in order to make a diagnosis of an increased intracranial pressure. If, however, in these traumatic lesions of the brain, we must wait until a "choked disk" results from extreme intracranial pressure in order to state that the intracranial pressure is high, and if we must wait for the pulse-rate to descend to 60 and below and the respiration and pulse to assume the irregular Cheyne-Stokes character of medullary compression, then undoubtedly the mortality of these patients will be 50 per cent. and even higher. Patients should not be allowed to reach this dangerous stage of medullary compression—this stage should, and can be, anticipated by repeated ophthalmoscopic examinations and the measurement of the pressure of the cerebro-spinal fluid at lumbar puncture.

In selected cases of mild intracranial pressure due to trauma, very frequently the convalescence can be shortened, the headaches relieved and the general condition of the patient greatly improved by lumbar puncture, and if necessary, repeated lumbar punctures; not only will the edematous "wet" condition of the brain be drained in this way, but a prolongation of the increased pressure will be avoided and therefore the definite danger of post traumatic conditions, so common in these cases, be lessened. Naturally, this method is only applicable to mild selected cases and lumbar puncture should never be advocated as a means of drainage in patients having high intracranial pressure or in sub-

tenity. Factors for fear of a consequent medullary compression in the foramen magnum.

We now come to the most important and the difficult question in the treatment of brain injuries with or without a fracture of the skull: "If an operation is advisable, when should it be performed?" This question can more easily be answered by stating the two periods when the operation should *not* be performed. Naturally, we must exclude the majority (about two-thirds) of fractures of the skull which do not have a definite increase of the intracranial pressure and therefore no operation is indicated. (The depressed fractures of the vault naturally should always be elevated or removed.)

The two periods in which an operation is distinctly contra-indicated in cases of brain injury, are, first, the condition of severe shock in the very beginning, and second, the condition of medullary collapse—the death knell of the patient. A cranial operation upon a patient—no matter how badly the skull is fractured, nor how extensive the intracranial hemorrhage seems when the patient is in the condition of severe shock with a pulse-rate of 120 and higher, when the operation during shock takes away whatever chance the patient may have of surviving the shock to which the operation merely hastens the exitus. No patient having a brain injury should be operated upon in this condition of shock; the mortality is most high. If a patient does recover from an operation in this period of extreme shock, then he recovers in spite of the operation. Cranial operations for brain injuries in this stage of shock were frequently performed in the past and most disastrously, and thus operations were almost discredited in the treatment of brain injuries. The natural reaction following these early operations in the period of severe shock was to wait until there could be no possible doubt that the patient was going to die, unless a cranial operation was performed; that is, the patient was permitted to reach the period of extreme medullary compression—a pulse-rate of 50 and below, irregular Cheyne-Stokes respiration and pulse and profound unconsciousness—before a cranial operation might be considered. This is a most dangerous stage for these patients to reach, and it is doubtful whether recovery can occur even with an operation at this period. But if the patient has struggled through this period of medullary compression, and finally reaches the stage of medullary edema, when the pulse-rate begins to ascend quickly to 120 and higher, respirations become rapid and shallow—that is, the stage of medullary collapse—then we have the second period when no patient

should be operated upon—they all die, operation or no operation. I feel if these two extremes can be avoided and the latter medullary collapse can certainly be anticipated in the operative treatment of brain injuries and their signs cannot be overlooked, that the rational treatment from an operative standpoint depends upon the presence or not of a definite increase of the intracranial pressure whether there is a fracture of the skull or not. In some of the most serious cases no fracture was present—either to be ascertained at operation or at autopsy.

The aid of the Roentgen Ray is important in the diagnosis of these traumatic cases only in patients with doubtful depressed fractures of the vault, and in latent fractures of the skull, where the bump is apparently so trivial that the patient might not be examined and treated as carefully as the condition would warrant. On the contrary, no patient with high cranial pressure should be obliged to wait "over night" or for a period of hours merely to secure a Roentgen Ray picture of the skull; it is of no importance in the treatment of these acute intracranial lesions whether a fracture is present or not. If there is a high intracranial pressure, as shown by the ophthalmoscopic examination and by the measurement of the pressure of the cerebro-spinal fluid, then a cranial operation is indicated to relieve this increased intracranial pressure, both by enlarging the intracranial cavity and by the draining of possible hemorrhage and cerebro-spinal fluid. It is not so much a question of removing the hemorrhage as it is of lessening the increased intracranial pressure; whether that pressure is due to hemorrhage or edema, the operative indication is the same. Many cases of head injuries at autopsy have revealed no hemorrhage at all—merely a "wet edematous swollen brain, but sufficient to cause medullary compression and the death of the patient.

If an operation is considered advisable to relieve the increased intracranial pressure, then the operation of choice is the sub-temporal decompression and drainage; if there are no definite localizing signs of the intracranial lesion, then the decompression should always be performed on the right side in right-handed patients in order to lessen thereby any possible operative damage to the adjacent motor speech area. In these cases, it is not so important to remove the hemorrhage as it is to offset its pressure effects. In cases of depressed fractures of the vault showing definite signs of a high intracranial pressure, it is better surgical judgment to precede the elevation or removal of the depressed area of bone by a sub-temporal decompression so that when the depressed bone is removed there will be little or

no danger of the underlying cerebral cortex being damaged by its protrusion through the bony opening; as the sub-temporal decompression exposes a comparatively silent area of the brain—a portion of the temporo-sphenoidal lobe—its protrusion and possible damage would not appear clinically, whereas, a partial paralysis, impairment of sensation or of vision might occur, and frequently does result from operations performed over the more highly developed areas of the cerebral cortex. Besides, the sub-temporal route provides not only an excellent exposure of the middle meningeal artery and that portion of the brain so frequently involved in fractures of the skull, but it affords drainage to the middle fossa of the skull—the chief intracranial cistern—at its lowest point at the base of the skull; again, the thinness of the squamous portion of the temporal bone makes the operation a less difficult one technically. The vertical incision (and not the usual curved incision) should be used not only to make the operative hemostasis more effective in that the trunk of the temporal artery is clamped at its lowest point at the very beginning of the operation and therefore there is no bleeding from its branches, but this incision also permits the removal of the underlying squamous bone as far as is possible beneath the temporal muscle—and yet the attachment of the temporal muscle to the parietal crest is left intact so that a firm closure of its separated muscle fibres is assured; this is a most important point in cases of high intracranial pressure as in brain tumor where a cerebral hernia or fungus might result from an imperfect closure of the temporal muscle. The insertion of silver and celluloid plates and other foreign bodies beneath the scalp is to be most strongly condemned.

If the intracranial pressure is so high that the cerebral cortex tends to protrude through the bony opening, it is frequently wiser in selected cases to perform a similar operation upon the opposite side of the head immediately after the first operation. I have been obliged to do this in only five per cent. of the patients; the ones having a swollen edematous brain—"water-logged" as it were, where the drainage of blood and cerebro-spinal fluid is slight and not sufficient to cause a marked decrease of the intracranial pressure. In some doubtful cases, it is better judgment to wait for one or two days and even longer before the second operation is considered advisable. The rubber tissue drains are usually removed on the first or second day post-operative, and the hospital convalescence ordinarily requires at least two weeks. Naturally, these patients should not enter into their former active life for a period

of three months and even longer; a too early return to strain and stress of modern life predisposes them to many complaints—both subjective and objective. Repeated examinations of the fundus of the eye and of the superficial and deep reflexes are most important in estimating the physical normality of the patient.

The end results of patients having injuries with or without a fracture of the skull have been an interesting study. It has become quite a common belief that once a man has had a fracture of the skull and then recovers, he is never the same person again. In 1912, I examined the records of three of the large hospitals of New York City during the decade of 1900-1910; the mortality of fractures of the skull was 46-48 per cent.; the mortality of the patients operated upon was 87 per cent. This high percentage was due undoubtedly to the operation being postponed until the extreme stages of medullary compression and edema, and also to the fact that the operation performed was the "turning down" of a bone flap—a much more formidable procedure than a decompression—and then the replacing of the bone so that even the benefits of a decompression were prevented; besides, in many cases, the dura was not opened, and, as the dura is inelastic in adults, no adequate relief of the pressure could possibly be obtained. Of the patients, however, who were finally discharged as "well" or "cured," I was able to trace only 34 per cent., but of these 34 per cent. of the total patients found, 67 per cent. of them were still suffering from the effects of the injury—that is, two-thirds of them were not as well as before the injury! The chief complaints were persistent headache, a change of personality of the depressed or of the excitable type and thus emotionally unstable, early fatigue making any prolonged mental or physical effort impossible and thus the inability to work, lapses of memory, spells of dizziness and faintness, and even epileptiform seizures in a small percentage of them. In examining the hospital records of the patients having these post-traumatic conditions, it was most interesting to ascertain that these were the patients—and there were but few exceptions—who regained consciousness gradually after several days and remained in the hospital for a period of four weeks and longer, whose charts made frequent mention of the severe headache and a low pulse rate of 60 and in some cases below 60—that is, the usual clinical signs of an increased intracranial pressure; an ophthalmoscopic examination had rarely been made. Many of these patients still showed the results of the increased intracranial pressure in their fundi and at

lumbar puncture, and these were the ones upon whom a cranial decompression even at this late date caused a marked improvement; the operative findings were always associated with a "wet" swollen edematous brain. Many of the so-called post-traumatic neuroses are in my opinion frequently superimposed upon this definite organic basis as the result of the brain injury. The treatment, therefore, of brain injuries should not be limited merely to the recovery of the patient as far as life is concerned, but it should also be directed toward obtaining a normal individual—approximating as closely as possible the condition of the patient before the injury.

MORULAR OVARIAN NEOPLASMS: THE
SO-CALLED OVARIAN DERMOID
CYSTS: A BRIEF LITERARY
REVIEW, INCLUDING THE
REPORT OF A CASE.

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(Continued from April issue.)

Histo-pathology.—Little further need be said concerning the histo-pathologic aspects of complex ovarian neoplasms. All three of the germinal layers invariably contribute to the production of such tumors, as demonstrated by the presence of osseous, cutaneous, and visceral tissues or elements. According to Cumston a "dermoid" may be properly classified as an abnormal organ, composed of perfectly normal tissues, identical with the skin, and capable of giving rise to all the pathologic productions to which the cutaneous surface is liable,—such as cysts, keratogenic productions, verruca, etc., which sometimes present a high degree of development.

Hair in varying quantity is one of the most frequently observed cutaneous derivatives in the complex type of ovarian neoplasms; partially imbedded teeth and irregular fragments of compact bone are not uncommon; cartilage, glandular tissue, mucous and serous membranes, muscle and nerve fibers, cerebral substance, imperfect eyes, partially formed fingers with nails, mammae, and many other structures have been identified by histologic examination. In one recorded instance (Autenrieth) more than three hundred teeth were found. The teeth usually project slightly from the neoplastic wall, some are surrounded by tufts of hair, others are loosely inserted into imperfectly formed alveoli. Seba-

ceous material in greater or less abundance is almost invariably present, regardless of the location of the neoplasm.

According to Senn, in the embryo the ovaries develop from the genital ridge, which at an early date is intimately associated with the cells lining the peritoneum and connected with the peritoneal funnels. The origin of the Wolffian duct is intimately connected with the epiblast; consequently the ovaries are the site of the most complicated histologic processes during their development, and must necessarily frequently become the site of rests which, when excited to active tissue proliferation, furnish the material for the different kinds of "dermoids." Cyst walls which represent the external skin in their structure frequently contain all the appendages of the skin. The papillae of the skin are usually not well developed. Cysts with a derma lining contain the product of epithelial proliferation, which forms a pultaceous mass, variable in consistency, resembling in every respect the contents of sebaceous cysts. The lanuginose hair may consist of a fine down or may grow to the length of several feet. The hair is of a yellowish or reddish color, "and as it is shed from the follicles it accumulates in the cyst in masses pasted together by the sebaceous material." (Senn.)

It is estimated that between three and four per cent of all ovarian tumors are morular or blastodermic in character; they may be either unilocular or multilocular, and likewise unilateral or bilateral. In multilocular neoplasms one or more loculi may contain cutaneous and osseous derivatives, while others may be simple serous or mucous cysts. The proportion of bilateral compared with unilateral cases is about one to seven. (Mantel, Gebhardt.) Vaccari found both ovaries involved in fourteen per cent of instances.

Symptomatology and Diagnosis.—As the clinical symptoms induced by morular ovarian neoplasms are essentially those noted in ordinary tumors involving the adnexa, ante-operative differential diagnosis is more often than otherwise absolutely impossible. In the majority of instances, where the diagnosis of "dermoid" cyst has been made prior to operation or necropsy, facts were merely assumed which happened to be later verified. The nature of the neoplasm may be determined by roentgenoscopy in a small percentage of cases. Let it be emphasized that, despite the skill and erudition of the observer, there are no discoverable pathognomonic ob-

jective clinical signs by which the nature of complex ovarian neoplasms may be positively recognized.

The retardation in development of such tumors is not invariably diagnostic, because simple ovarian cystomata oftentimes progress slowly and induce no symptoms by which their character may be positively differentiated. The "lack of elasticity" imparted to the examining fingers upon superficial or deep palpation, upon which much emphasis hitherto has been placed, possesses no especial diagnostic significance, since this phenomenon may be observed in any variety of ovarian tumor.

It is admitted that ovarian neoplasms in youthful individuals are more likely to be morular; but the exceptions are so numerous that it may be asserted with a reasonable degree of certainty that the age of the patient bears no definite relationship to the character of the neoplastic formation.

In women of child-bearing age the gradual abdominal enlargement, especially in bilateral ovarian neoplasms, has oftentimes been mistaken for normal utero-gestation; and unilateral tumors have been confounded with extra-uterine pregnancy, salpingitis, appendicitis, etc. The pressure symptoms are likely to be identical, regardless of what may be the determining causative factors.

Menstrual disturbances and irregularities, upon which considerable emphasis has also been placed by various observers, are of no especial importance from a diagnostic standpoint. While amenorrhea, dysmenorrhea, menorrhagia and metrorrhagia may occur during the development of morular ovarian neoplasms, the causal relationship cannot be satisfactorily explained upon any hypothesis thus far suggested.

Urinæ disturbances are frequently noted during the progressive development of all varieties of ovarian neoplasms, because of interference with vesical function which the pressure effects entail.

Where complications have ensued, such as torsion of the pedicle, rupture, gangrene or malignancy, the symptoms are intensified and the diagnosis of a surgical lesion becomes readily apparent; but the exact nature of the pathology cannot even then be foretold with certainty.

Prognosis and Treatment.—One of the most serious complications to be feared is rotation of the tumor and torsion of its pedicle, with the

consequent obliteration of the blood supply. This may result in infection, suppuration, and gangrene of the sac and its contents. Pyogenic infection is unlikely without marked circulatory interruption.

Rupture of the cyst has been known to occur, followed by peritonitis with fatal termination. In other instances the accident has been followed by multiple secondary peritoneal neoplastic formations; in still others the contents escaped through the vagina, the umbilicus, the rectum, or the cutaneous integument, with a resulting permanent suppurating sinus. Retention and encystment is the greatest rarity.

The larger the neoplasm the greater the clinical manifestations from pressure and interference with the functions of adjacent viscera. Small slowly developing tumors with unrestricted circulation may exist unobserved for months or years. Instances have been recorded where at operation the pedicle had disappeared, the neoplasm receiving its nourishment from omental or other visceral attachments.

The advent of pregnancy may be of serious import in the presence of any variety of ovarian tumor; but this seems especially true of the morular type because of the greater danger of rupture from pressure; and rotation with torsion of the pedicle. Williams found cysts of this type three times more frequent in pregnant than nulliparous women. Of three hundred and thirty-one cases collected by Manton ninety-two were associated with pregnancy. Samgin, on the other hand, observed but five ovarian cysts in seventeen thousand eight hundred and thirty-two labors at the Berlin Gynecological Clinic; in ten thousand eight hundred and ninety-three pregnancies at one of the largest lying-in hospitals in the world, only two morular ovarian neoplasms were encountered; a gravi uterus was discovered by Delatrez twelve times in eleven hundred and thirty-two patients with ovarian tumors; in three thousand two hundred and seventy-five oophorectomies for tumor mentioned by Olshausen three and one-half per cent were morular in type. "Most authorities agree that the presence of an ovarian tumor during gestation is one of the most serious complications, as it markedly increases the probability of abortion and frequently offers an insuperable obstacle to delivery; moreover, its presence gives rise to disturbances during the puerperium which menace the life of the mother." (Doyle.)

While all varieties of ovarian neoplasms may complicate pregnancy, the morular type seems to have been noted with the greatest frequency. In one hundred and seven cases mentioned by McKerron the type of the tumor was morular in forty-three per cent; Spencer reported forty-one cases with thirty per cent morular. In three hundred and twenty-one pregnancies with coincident ovarian tumors cited by Remy there were seventeen per cent abortions or premature labors; of seven hundred and twenty-one cases in which gestation was uninterrupted the maternal mortality was twenty-one per cent and more than one-half the children perished. (McKerron.) "The presence of the tumor seems to have no influence on menstruation or conception; a great many women go to term without knowledge of its existence, the growth of the neoplasm not being accelerated as in the case of fibroids, and abortion only taking place in the presence of complications." (Doyle.)

Halpenny recently reported the case of a woman four and a half months advanced in utero-gestation who had a violent attack of right-sided abdominal pain which persisted with occasional exacerbations for three days. She vomited and rigidity was marked over the right lower abdominal quadrant. Celiotomy revealed a gangrenous "dermoid" with twisted pedicle which had become entirely detached.

According to Lewis the frequency of ovarian neoplasms in pregnancy is one in three thousand, twenty-three per cent being morular in character. When the tumor causes disturbance from its presence during pregnancy, the most common complication is torsion of the pedicle, which occurs in eighty per cent of such cases. A larger proportion of ovarian tumors, especially the embryomata, rupture or suppurate during pregnancy than under other circumstances. In about one-third of the cases of complicating ovarian tumors more or less serious consequences ensue; in about one-fifth pregnancy is prematurely terminated.

The question of malignant transformation of morular ovarian neoplasms is one which has engaged the attention of surgeons and pathologists for many years. Like carcinoma elsewhere, no one has been able to adequately explain its mode of origin, *i. e.*, the etiology of primary carcinoma in any anatomic situation is absolutely unknown; and why a benign lesion undergoes malignant degeneration in one instance and not in ten thousand others under apparently identical circum-

stances, is also beyond present human understanding. No one knows the underlying cause of the mutations in cutaneous, glandular, and visceral tissues inducing the recognized proliferations which constitute malignant transformation.

While it may be true as claimed by eminent authorities that all malignant lesions have a local and benign beginning, the term "precancerous" is one of the most dangerous ever introduced into medical nomenclature. Despite the experience of the observer, he is never justified in positively stating that any benign lesion will eventually undergo malignant transformation. Many examples might be cited in substantiation of this assertion, but such details would be inadmissible in a paper of this scope and character. It has been repeatedly stated that morular ovarian neoplasms are peculiarly prone to undergo malignant changes, but the reasons therefor have never been specifically outlined. While present knowledge may justify the assertion that in complex neoplasms, *i. e.*, those containing elements from all three germinal layers, there seems greater likelihood of carcinomatous transformation than in simple cystic or solid tumors, it is recognized this is merely stating a clinical fact without advancing the least explanatory information. The dangers attending supervision of malignant change in morular ovarian neoplasms should not be overlooked in considering the prognosis and treatment.

There is but one method worthy of consideration in the treatment of ovarian neoplasms, and that is surgical extirpation by celiotomy so soon as the neoplastic formation is recognized. Although certain gynecologists seem to believe otherwise, the abdominal route should be always employed in dealing with ovarian tumors, whether simple or complex, unilateral or bilateral. In morular neoplasms for obvious reasons puncture should be avoided if possible, and every vestige of the cyst wall must be removed to insure permanency of the operative cure. The technique of celiotomy for ovarian tumors has been perfected to such degree that there is nothing of importance to be added to what is already well known to every gynecologist of average experience.

The question of drainage after adnexal extirpation has been debated for many years, but no general rule applicable to all cases can yet be formulated. In every variety of surgical procedure much depends upon the experience and

personal equation of the individual operator. A sensible working rule is never to drain the abdominal cavity unless there exists adequate reason for so doing, and where drainage is indicated fenestrated rubber tubing should be used. Why gauze was originally advocated for the purpose of drainage is beyond understanding; it is obstructive rather than eliminative, hence defeats the object sought to be attained.

Irrigation of the abdominal cavity following celiotomy is no longer practiced unless infection has occurred, and even then the utility of the procedure is open to serious question. If irrigation seems necessary or advisable, normal saline solution should be employed for the purpose. While the intra-abdominal introduction of tincture of iodine has been strongly recommended where extensive infection has supervened, I have had no personal experience therewith. However, the most gratifying results have been reported from this method of treatment in peritonitis and infections accompanying or following traumatic injuries.

Morular ovarian neoplasms are almost invariably pediculated, and their extirpation is, therefore, attended by little danger unless complications have already ensued when the aid of surgery is invoked; and the operative mortality should be no greater than that attending operative intervention for simple ovarian tumors. In the presence of torsion of the pedicle with gangrene, rupture, or infection, the clinical and operative dangers are correspondingly increased.

Pregnancy is not a valid contraindication to surgical treatment when the tumor constitutes a menace to life or offers an apparently insurmountable obstacle to successful accouchement. In small tumors situated high in the pelvis, operation may sometimes be safely postponed until after the patient has convalesced following delivery, always remembering that the presence of an ovarian tumor constitutes a distinct menace to the life of the individual.

Case Report: Mrs. B., aged thirty, married nine years, the mother of one child now eight years old, first consulted me about four months ago. There was nothing worthy of note in her personal or family history. She stated that her health had always been good until the birth of her child eight years before, since which time she had suffered more or less from dysmenorrhea. There had been no subsequent pregnancy, although she was anxious to have another child.

This patient came to me complaining of pain in the lower right abdominal quadrant, more or less continuous metrorrhagia, progressive loss

of flesh and strength, slight dysuria and pollakiuria. Her urine was examined upon several occasions, and excepting a trace of albumin and an increase in the leucocytic content, no abnormalities were noted. Her temperature was 99° F., pulse 80, and she did not appear to be seriously ill.

Physical examination by the bimanual method revealed a pelvic tumor apparently the size of a small orange, which was slightly more prominent upon the right side. There was considerable tenderness over the lower right quadrant, and for that reason my examination without a general anesthetic was not entirely satisfactory. The enlargement seemed to be connected with the uterus, and the continuous hemorrhage caused me to suspect an intra-uterine tumor, most likely a polyp of fibroma. With this tentative diagnosis an anesthetic was administered and curettment performed, but the intra-uterine surfaces were normal. With the abdominal muscles relaxed under anesthesia no especial difficulty was experienced in demonstrating that the tumor was of ovarian and not uterine origin, and the diagnosis was accordingly changed to right ovarian cyst.

Celiotomy by median incision was immediately performed, and the tumor was removed without untoward incident, the abdomen being closed in the usual manner without drainage. Convalescence was uninterrupted, the patient leaving the hospital fifteen days after the operation. There has been no further pain or metrorrhagia, and the woman has regained her former weight and strength.

The symptoms in this case were clearly attributable to the mechanical effects of the tumor; it was deeply situated in the pelvis, and considerably larger than anticipated at the time of my examination. The uterus was displaced toward the left side, and pressure upon the urinary bladder had interfered with the function of that viscus.

Examination shows the neoplasm to be typically morular in type, containing all the histologic elements usually noted, viz., cutaneous integument, sebaceous material, one large and three smaller tufts of hair, five imperfectly formed teeth, and a few irregular osseous fragments. The tumor is ovoid in shape and measures two and a half by three and a half inches in its largest diameters.

(To be continued.)

WAR AND LAUGHTER

"Laugh and help win the war," said one optimist. When laughter is not silliness, when it is genuine merriment, over-riding difficulties and dangers, when it manifests courage and a mental attitude of confidence that would simply find relaxation, then is the injunction worthy of every man's attention. The value of a wholesome laugh in terms of health is undoubted."—*The Social Hygiene Bulletin*.

RESULTS OF THE CARREL-DAKIN METHOD OF WOUND TREATMENT AT THE FRENCH FRONT*

DR. A. H. EBELING
NEW YORK CITY

This method of the treatment of infected wounds has been developed in the course of two years by direct experiments on the wounded. Researches were conducted in the laboratories of the temporary hospital No. 21, at Compiègne, which was largely aided in its work by the Rockefeller Foundation. The following doctors have been associated with Dr. Carrel in his work: Surgeons Dehelly, Guillot and Woimant; the chemical work was done by Dr. Dakin and Dr. Daufresne. Captain Lecomte du Nouy made the mathematical and physical researches. The purpose of the method was to prevent or to stop suppuration, to sterilize the wound and close it. It is due to a combination of processes which make it possible to employ antiseptic substance under such conditions that they are entirely efficacious.

The method involves no new principles. The road was opened by Pasteur and Lister, the surgical technic used being known to every surgeon. Neither is the method characterized by the use of any new chemical substance. The antiseptic properties of hypochlorite of soda have been known for a long time. The progress is due to the systematization of these procedures in a new way. This systematization has been brought about by scientific investigation and the employment of two methods utilizing measurements. The first was the bacteriological study of the condition of the wound and the recording of these steps on a curve showing the states of the disinfection. The second was that of measuring the progress of healing by means of a precise technic based on the discovery of some of the laws of cicatrization. The method, therefore, is dependent upon the employment, rigorously controlled by the microscope, of an approved agent, under conditions of contact, concentration and duration, established by direct experiments upon infected wounds.

The antiseptic chosen is the Dakin solution of hypochlorite of soda, neutral to powdered phenolphthalein. Dr. Carrel gave the name of Dakin's Solution to sodium hypochlorite, deprived of the alkalinity, in order to distinguish it from Labarraque's solution, which contains a great deal of alkali. Its advantages are: its high bactericidal power; its dissolving action on necrotic tissues; and the ease and

cheapness of its preparation. The concentration has been empirically placed between 0.4 and 0.5%. If the percentage of sodium hypochlorite is less than 0.4%, the antiseptic power of the solution is too low; if greater than 0.5% the solution is irritating.

The action of Dakin's solution: on bacteria and tissues was studied by the comparison of the curve of sterilization and of cicatrization. These experiments showed that sterilization was obtained without any destructive action upon the living tissues.

The action of *Hypochlorite* in solution on an infected wound comprises two processes.

1. *Chemical reaction;* bacteria as well as other organic material in wounds, necrotic tissue, blood clots, are dissolved—chlorine-nitrogen compounds are formed of the nature of chloramines.

2. *Antiseptic action;* not only of the hypochlorite itself, but also of the chloramine compounds so formed.

It is important to emphasize the following facts: The Hypochlorite solution *will dissolve necrotic tissue and blood clots*. Chloramine T and dichloramine T in oil have *not the power to dissolve* necrotic tissue and blood clots.

Dakin's solution may be satisfactorily prepared in any one of several ways. *First*, by double decomposition of calcium hypochloride and sodium carbonate. This method, the one first used by Dakin, has been, because of the ease of obtaining the necessary chemicals, the most available one. The alkalinity of the solution, after the precipitation of the calcium carbonate is neutralized by the use of a mixture of sodium carbonate and sodium bicarbonate in the precipitation. In either case, it is necessary to determine the percentage of available chlorine in the bleaching powder with which one is working. *Second*, by the electrolysis of a sodium chloride solution, this method gives the product a non-irritating quality, but requires apparatus and electric current which are not always available. A third very simple method has been developed here by the action of liquid chlorine on sodium carbonate.

The most efficient action of an antiseptic is obtained only when it enters into intimate contact with the bacteria causing infection. Therefore surgical and mechanical cleansing is *essential*.

The soldier after being wounded is a man in a state of incubation—inoculated with bacteria. The substance of the wound is composed of blood clots, muscular debris, undergoing autolysis, forming a splendid culture medium. To alter these ideal conditions for the development of bacteria is of prime importance. The wound must be widely opened and maintained open. No call for hesitation in making

*Presented before the American Medical Association, New England Association of Physicians, and the American Association of Surgeons, 1917.

very free incisions exists. War wounds are more extensive than they appear. Under a small skin wound there may lie a large bruised, necrotic and destroyed area of muscle tissue, infiltrated subcutaneous tissue, blood clots, missiles, and above all shreds of clothing which carry and disseminate the dangerous gas producing organism (spores of *Welsh bacilli*).

No modification or change can be made in either the solution itself nor in the processes for the mechanical and chemical treatment. Both mechanical and chemical treatment are important. If the surgical work has been inefficient, no method will give the sterilization necessary for tissue regeneration.

TREATMENT OF FRACTURES*

J. SHERMAN WIGHT, M.D.

BROOKLYN, N. Y.

I desire to emphasize the difficulty that the surgeon finds in deciding if a hip has been injured. If he sees the case soon after the accident and obtains an x-ray, a fracture may be distinguished from a number of other conditions which, however, bear a strong resemblance to an impacted or united cervical fracture.

In children—An epiphyseal separation resembles depression of the neck in coxa vara. Both give discomfort, limp, limitation of motion, shortening, atrophy, and a prominent trochanter. Tuberculous disease is a chronic process and may be aggravated by an injury therefore should be seen early. Osteomyelitis is usually acute, but if chronic the joint is ankylosed.

In adults—I will refer to fracture of the femoral neck, coxa vara, arthritis deformans, tumor or malignancy of bone, and osteomyelitis. A bone with malignant disease breaks spontaneously or with very little violence. This would be disclosed with x-rays. Osteomyelitis would be recognized with x-rays. On the other hand, the symptoms of the other conditions as well as the x-ray pictures would be very much alike if the case was seen a long time after the injury, therefore, the surgeon must be very alert to discover the old history no matter how carefully it is guarded.

A fracture of the neck of the femur is the most disabling of all fractures. We do not distinguish its relation to the capsule. The object of treatment is to obtain a functionally useful leg. Buck's extension and the long side splint give very poor results. Whit-

man's abduction method is better. The best results are obtained with the bone peg and abduction in plaster. It is indicated in all operable, unimpacted fresh fractures in patients up to fifty years of age and in operable ununited fractures.

Before the surgeon gets to the treatment of these fractures he has a good many difficulties to overcome. I want to say a few words about the diagnosis of fractures.

Now I would like to say just a few words about the treatment of fracture at the neck of the femur. I understand that there is one method of treatment, for this one has been so far standardized, that there is no question as to what the procedure should be if one has made the diagnosis. The long side splint of course gives very poor results and the result of fracture of the femur is an impairment of the functions, which is very serious, and we must do something to repair the broken bone.

Whitman's method undoubtedly gives very satisfactory results, but not in all cases; but I have never been able to put the limb in position without using the fracture table, any more than I have been able to repair the broken bones without the use of a fracture table to fix the fragments after reduction until the case has been put on, even though I have united the bone with some form of uniting material, suture, or whatever it may be. In my experience in operable cases, bone-peg is the best method of repairing a fractured neck of the femur; it doesn't make any difference whether it is a child or an adult. In order to get the best results one must use the fracture table and fix the fragments during the time that one places the bone in position and during the time of the plaster cast with abduction to secure it and maintain it in position.

Now, as to the method of treating fractures in general, if I may digress a little, I would like to say that I have done away with the bone plate. I do not use the bone plating any more or silver wire. Both of them are foreign bodies and cause considerable irritation and they should be removed after the cementing of the fragments; in place of them I use, almost altogether, a bone suture; in children, always chromic gut and, in adults, kangaroo tendon. After having fixed the fragments on a fracture table and securing them with the suture and apply the plaster cast so that I have no difficulty about it slipping. Of course, if there is going to be non-union, that is a different matter, but in cases where it proceeds to unite, I find that is the best method. However, I will say in long spiral fractures I have to use the bone screw, but that can be removed and is never left in position.

* Read before the New York and New England Association of Railway Surgeons, November 8th, 1918.

American Journal of Surgery

ESTABLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, JR., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and correspondence should be addressed.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, MAY, 1918.

THE RESTORATION AND REPAIR OF THE WOUND, COMBATING CONTAMINATION AND INFECTION.

It seems curious that the paramount feature of this war's surgical investigations should be a harking back to first principles, namely, the treatment of wounds. One would suppose that, after half a century of Listerian methods, a period in which the use and development of surgery had reached an amazing fruition, that the treatment of a simple wound would be so firmly established as to be beyond controversy. The only surgical discoveries of any importance, that this war has brought forth, have been in the domain of what may correctly be considered elemental surgery. Indeed, those who have tried to keep in touch with surgical progress have been bewildered by the number of new methods that have been introduced for the treatment of wounds. All, or nearly all, have been acclaimed by their advocates as methods of choice; strangely enough, the compensating leaven of criticism has been woefully lacking. We have long felt the pressing need, therefore, of a discerning critique of these methods from an *ex cathedra* source, and by one whose reputation and war experience are such as to command respect. Such a critique we now find in a short but admirably written paper by Crile (The Restoration and Repair of the Wound, Combating Contamination, *Surgery Gynecology and Obstetrics*, April, 1918).

Crile divides the repair of the wound into four stages: 1. The stage of depressed local resistance, i. e., the first twelve hours. 2. The stage of infection. 3. The stage of granulation and healing. 4. The superficial healing; end-defects, sinuses, etc. Obviously the most important stage is the first. Here the indications are two: 1, restoration of depressed local resistance; 2, destruction of contaminating bacteria. Depressed local resistance is a factor which surgeons, as a class, have not hitherto appreciated, for the reason, probably, that few surgeons have had the opportunity to study traumatized wounds in such masses as have occurred during this war. One of the first lessons that surgeons abroad have learned is that devitalization of tissue contributes largely to delayed healing of the wound, because the tissues expend unnecessary energy in getting rid of such tissues. Crile, therefore, recommends that all devitalized tissue must be removed at once. This must be done lightly and sharply. At the same time the wound must not be handled roughly by sharp retractors, by grinding tissues between sharp edges of bone, etc. As Crile militaristically puts it, "With the aid of damaging inhalation anesthesia, the rough surgeon does slowly and awkwardly what shrapnel does painlessly and quickly—the shrapnel injury is to be preferred."

Next in importance to "excision revision" is the application of the principle of physiological rest. This means not only the gross rest obtained by supports and bandages, but even the finer cellular rest obtained by avoiding tight sutures and bandages, the prevention of an accumulation of discharges in the wound, the avoidance of all pain in dressings and the elimination of damaging antiseptics.

Crile's comment on the use and value of antiseptics is illuminating. He predicates his discussion by the postulate that the best antiseptic is the bactericidal power of the tissues. This is another reason why the tissues must be kept at their highest point of activity, by not permitting anything to devitalize them. As for chemical antiseptics, Crile rightly insists that none can command good results with bad surgery. Unfortunately in the rush of battle, good surgery cannot always be commanded, so that chemical antiseptics must be depended upon. "Again, if a wound has become infected in the midst of good surgical opportunity, antiseptics may be required." If the wounds are deep and extensive and facilities are excellent, the Carrel-Dakin is the method of choice. If, however, there is a rush of cases, B. I. P. (Bismuth 25. Iodoform 50. Paraffin 25.) is an excellent dressing; a good B. I. P. dressing is better than defective Carrel-Dakin treatment.

Many wounds do well with Eusol, and many travel well with a Wright (hypertonic salt solution) pack.

In the stage of infection, the treatment consists in physiological rest and incision and drainage. In addition, heat, preferably in the form of moist heat, is indicated, with elevation of the wounded member. If good surgical facilities are not available, B. I. P. dressings are again preferable to Carrel-Dakin. Especially to be avoided during the stage of acute infection are, pain, lipid solvent antiseptics and rough handling. As Crile again forcibly states it: "If one were endeavoring to produce septicemia experimentally, one of the best methods would be to first 'gas' the phagocytes with chloroform or ether; and then 'bonejah' through the established line of defense."

In his paper, Crile shows that the treatment of a wound is not a simple matter, and that the surgeon must always adapt his methods to the nature of the wound and the exigency of the situation. Certainly, these observations emphasize a view that we have always held; namely, that the test of a surgeon does not consist in his ability to execute a difficult operation, but in watching him dress or even direct the dressing of the ordinary open wound.—E. M.

THE VALUE OF THE PRIMARY SURGICAL AID IN WAR INJURIES.

The dominant lesson, which the present war has so thoroughly taught, is that the terminal result after any injury, which does not kill immediately or within a few hours, depends with almost mathematical precision upon the celerity with which medical assistance is given and upon the character and efficiency of the surgical first aid which is rendered. The hitherto prevailing opinion has undergone a complete revolution, and the watchful waiting of the Boer and other wars has been discarded and replaced by an intelligent aggressiveness which realizes that in desperate conditions active measures are essential. Happily this policy has been abundantly justified by superior results.

No new principle has appeared. Methods which are in ordinary usage in civil life have been applied and have been followed by approximately similar successes. Abdominal injuries, especially, have been benefited by this new policy of utilizing the most expert surgical skill at the earliest possible moment after the reception of the injury. Under such conditions, also, it has been found that the sequence of events in military injuries has paralleled that frequently seen in civil life.

It has proved singularly fortunate for the wounded of the present war, that the exigencies of military activity have not demanded rapid and re-

peated changes of position. The line of battle, except for some slight variations, remains more or less fixed; and the methods applicable in a fixed community have been found possible of accomplishment. Units have been gathered especially fitted by training, and frequently composed of men accustomed to work together, the total result marked by skillful efficiency. These have been sent to within a short distance of the firing line (one or two hours by motor transport); and the first aid has lost its former meaning and has acquired a thoroughness which has been followed by results which leave little to be desired.—A. O. W.

AN IMPERATIVE APPEAL FOR MEDICAL OFFICERS.

An urgent and imperative appeal has just been issued by the Surgeon General of the United States Army, for doctors for the Medical Reserve Corps.

There are to-day 15,174 officers of the Medical Reserve Corps on active duty and the Medical Department has reached the limit of medical officers at the present time available for assignment. With these facts before the medical profession of this country, we believe that every doctor who is physically qualified for service between the age of 21 and 55 years, will come forward now and apply for a commission in the Medical Reserve Corps.

The Surgeon General says: "So far the United States has been involved only in the preparatory phase of this war. We are now about to enter upon the active or fighting phase, which will make enormous demands upon the resources of the country." The conservation of these resources, especially that of man-power, depends entirely upon an adequate medical service.

Drafts of men will continually follow drafts, each of which will require its proportionate number of medical officers, and there are at this time on the available list of the Medical Reserve Corps an insufficient number to meet the demands of these drafts.

The real necessity for the complete mobilization of the entire profession is imperative. It is not a question of a few hundred men volunteering for service, but of the mobilization of the profession for the conservation of the resources of this country. Let every doctor who reads this editorial and appeal from the Surgeon General, which appeal is based upon dire necessity, act promptly and present his application for a commission in the Medical Reserve Corps at the nearest Medical Examining Board. If you are not informed of the location of your Board, the Editor of this journal will advise you.—MACD.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

THE RECONSTRUCTION AND REHABILITATION OF SOLDIERS.

The problem of the rehabilitation of graduates from the school of war experience will depend in no small measure upon the physical reconstruction of those who have suffered from diseases and wounds. The experience in all sections of the world indicates the problem of preparing wounded soldiers for re-entrance into civil and industrial life as a matter of the utmost importance.

In the past, hospitals have been satisfied to perform their amputations and issue a discharge card after the wound has healed. The single instances of maiming did not attract our attention. When, however, thousands of men will present some form of injury interfering with functional power, the government interest does not cease with the complete repair of the wound, but carries over until the deformity is concealed or the disability is overcome to the greatest possible extent. The old idea of the cure and relief of an injury is being transformed into the clear and more rational thought, the cure and relief of the man. In the English experience, according to F. D. Patterson (*Medicine and Surgery*, February, 1918), "over 1,000 men returned as unfit for further service, 453 are rendered so by injuries and 547 by diseases. Thirty-two in the thousand have wholly or partially lost their sight, 49 have lost an arm or leg, 264 have had serious injuries to their limbs or to the hand, about 60 have suffered miscellaneous hurts. Of the diseased, the largest total, 124, is accounted for by ailments of the chest, about half being tuberculous; the second largest, 110, by diseases of the heart; the third, 67, by what may be called nervous troubles, of which 11 are cases of epilepsy and 9 of insanity." According to the *Lancet* of July 21, 1917, the present number of war cripples in England is in excess of 200,000.

It is patent that the surgical and educational resources of our country are to undergo a new test. The problems of industrial accidents and diseases have been regarded mainly as solved by the provision of adequate systems of compensation or insurance, with comparatively little stress being placed upon the reconstruction or rehabilitation of the suffering individual. If men are to have their economic value lowered by service in behalf of their country, there is a heightened responsibility of the nation to return them to their families and to the

community in the best possible condition to take up their burdens on a basis of self-support and comparative independence of the assistance, ordinarily termed charitable.

The federal disability compensation will be exceedingly helpful, while the Workmen's Compensation Laws will undoubtedly be amended so as to deal justly with those who will come under its provisions in a condition far from normal. The main steps to be taken, however, will require the most skillful form of medical and surgical treatment, guidance in the choice of a future occupation, together with adequate technical training to fit for it, the establishment of employment exchanges that will secure positions, and the maintenance of medical supervision for a sufficiently long period to determine that the occupation is not acting unfavorably upon the health or welfare of the reconstructed man.

Under the circumstances, every hospital must have its social vision enlarged so that it may see the importance of protecting, not merely those who are injured in warfare, but the 300,000 human beings who each year suffer serious industrial accidents. Pain and suffering incident to injury are of minor consequence compared with the anxiety, depression, and wastage which result from failure to reconstruct, physically and mentally, those who have been penalized through the shortcomings of our industrial organization.

A new era is at hand which will recognize that the crushing of a finger carries with it a greater loss to society than the removal of an appendix, and that the loss of an eye is a more serious handicap than the removal of a gall-bladder. From the standpoint of social stability, a large proportion of our so-called major operations are minor in effect, while the minor injuries of the past take on a new significance because of their serious effects upon the human resources of the country.

THE GREATER WAR.

In the various nations engaged in this war, in times of peace, over 6,500,000 die annually from preventable diseases. There have been fewer than 7,000,000 killed in action on all sides since the outbreak of war. Obviously, then, all the battles in the interest of humanity and the interests of nations are not fought in the firing line. The perennial warfare waged against the invisible foe is as important—if not more so—than that now waged against those who are threatening the destruction of the very principles of civilization.—CHAS. J. HASTINGS, M.D., in *The Toronto Bulletin*.

Book Reviews

Military Surgery. DUNLAP PEARCE PENHALLOW, S.B., M.D. (Harv.), Major Medical Reserve Corps, United States Army; Chief Surgeon American Women's War Hospital, Paignton, England; Formerly Director of Unit, American Red Cross European Relief Expedition. With Introduction by SIR ALFRED KEOGH, K. C. B., Director-General Army Medical Service. Original Drawings by the Author. *Second Edition.* London: Henry Frowde, Hodder & Stoughton. OXFORD UNIVERSITY PRESS, Warwick Square, E. C., 1918.

The rapid development of experience in the treatment of wounds, due to war injuries, makes it difficult for the published literature to keep pace with the most modern thought. It is only a few months since Penhallow's most excellent book was presented to the medical profession and already his second edition is required for the further consideration of numerous theories which, seemingly, were valuable but now appear to be of less importance. The great advance in the treatment of infected wounds by the technic established by Carrel, is given thoughtful consideration in the revised edition, and in consequence, the chapter devoted to Treatment of Wounds has been thoroughly revised, in view of the more recent experiences with Dakin's Solution and the Carrel Tubes. The illustrative material has been considerably enriched and the subject matter expanded about one-third.

In every way, the second edition has enhanced value for the student or practitioner of surgery, whether his work is in civil or military fields.

A Practical Text-Book of Infection, Immunity and Specific Therapy: With Special Reference to Immunologic Technic. JOHN A. KOLMER, M.D., DR. P. H. M. Sc. Assistant Professor of Experimental Pathology, University of Pennsylvania; Professor of Pathology and Bacteriology, Philadelphia Polyclinic, and Pathologist to the Department of Dermatologic Research; Pathologist to the Philadelphia Hospital for Contagious Diseases. With An Introduction by ALLEN J. SMITH, M.D., Sc.D., LL.D. Professor of Pathology, University of Pennsylvania. With 147 Original Illustrations, 46 in Colors, by Erwin F. Faber. Instructor of Medical Drawing, University of Pennsylvania. *Second Edition*, Thoroughly Revised. W. B. SAUNDERS COMPANY, Philadelphia and London, 1917.

The success of the first edition of Kolmer's work, and the rapid advancements made in the branches of medicine which it covers are adequate reasons for the publication of the second edition. There is no alteration in the general plan of the work, but various additions and modifications have been made in order to bring up to date the information provided upon various topics, such as Focal Infection, The Schick Toxin Test for Immunity in Diphtheria, Complement Fixation in Tuberculosis and Other Bacterial Infections. The chapter dealing with Bacterial Vaccines has been amplified and improved, although in some instances there is not an equality of discussion in the revision. The discussions on the treatment of Poliomyelitis with serums is adequate, though, of course, it is impossible to place in a book everything that might be desired and still retain the pages within a reasonable number.

Particular attention is merited by the chapter on Chemotherapy, in which there is a discussion upon the toxicity of Salvarsan and its congeners.

The section on Experimental Infection and Immunity is again included, and it is to be hoped that it always will be included in future editions as it is a most valuable adjunct for students of the subject and of no uncertain assistance to those who play the rôle of teachers.

In short, the second edition continues to support the claims of those who deem this volume the most complete, comprehensive and elucidating treatise upon Infection, Immunity, and Specific Therapy.

In most books, the appendix represents an after-thought,

not essential to the understanding of the body of the book, but Ford has made the appendix one of the most useful sections in that he has presented a large series of blanks and forms filled out for explanatory purposes and has related them to the regulations or general orders authorizing them. Almost 200 pages are devoted to the tabulation of forms and methods as demanded in following out the instructions of the War Department, The Medical Department, and various other sources of regulations and instructions.

The authoritativeness of this book is vouched for by the introduction which is merely a recommendation by the Surgeon General of the Army ending with these words: "I hope every medical officer in our service will furnish the men with a copy." To this hope of the Surgeon General there may be added the statement that those who are not in the army service, but who desire to have an intelligent conception of the duties and responsibilities of the medical service in the Army should familiarize themselves with this meritorious compendium, the presentation of which at the present time is most beneficial, and should lead to greater efficiency of the Medical Corps.

Details of Military Medical Administration. JOSEPH H. FORD, B.S., A.M., M.D., Colonel, Medical Corps, U. S. Army. With 30 Illustrations. Philadelphia: P. BLAKISTON'S SONS & Co. Octavo, 733 Pages. Price, \$5.00.

The difficulties of acquiring the requisite knowledge for military administration by medical men are lightened through the publication of this excellent volume by Ford. In many ways the book represents a compilation of practical facts and authoritative regulations which could only be secured under ordinary circumstances through the reading and studying of a large number of official publications of the Army, Navy, and Public Health Service. The data officially promulgated are reinforced and supplemented by many notes from published articles or unpublished memoranda, made by men thoroughly competent to have opinions and judgments by reason of practical experience in administrative work.

It is difficult to point out specific chapters of paramount importance because each one so thoroughly presents the subject matter that it is designed to present for the information of the medical officer. Among the chapter probably most useful to the newly appointed medical officer are those describing the duties and responsibilities of the Regimental Surgeon and Post Surgeon, and the ones relating to the Examination of Recruits and Malingering. Every chapter, however, is explicit, thorough, and useful, and must necessarily be of pronounced assistance to the man who, having left civil life, is taking up the work of a Medical Military Administrator.

Blood Transfusion, Hemorrhage and the Anemias.

By BERTRAM M. BERNHEIM, A.B., M.D., F.A.C.S., Instructor in Clinical Surgery, The Johns Hopkins University; Captain, Medical Officers Reserve Corps, U.S.A.; Author of the "Vascular System," etc. Octavo; 259 pages; 18 illustrations. Philadelphia and London: J. B. LIPPINCOTT COMPANY, 1917. \$4.00.

The present volume, an outgrowth of a chapter on blood transfusion written in 1913 as part of a monograph on surgery of the vascular system, introduces the subject to us with a short historical sketch. Following this there is a compilation of the facts known concerning the physiology of the blood; and special attention is paid to the phenomena of bleeding, its control and the factors involved in determining the danger limits of hemorrhage. The subject of transfusion occupies the bulk of the book: chapters are devoted to indications, to the dangers accompanying or following this procedure—to be avoided by proper testing of donor and recipient,—and rather full descriptions are given of the various methods by which blood can be transfused.

A number of conditions—acute hemorrhage, the anemias, hemophilia, purpura, jaundice and leukemia—receive special attention: in the therapy of these diseases transfusion finds its chief place.

Some of the methods of transfusion, which are de-

present writing, two methods have been standardized: that for the transfusion of unadulterated blood (Lindeman, Unger); that for blood mixed with an anticoagulant (Hustin, Weill, Lewisohn). These have assumed dominant positions and their continued efficacy promises that future modifications will be trivial. Perhaps of these the citrate method will prove the most elastic, the most widely applicable in regions devoid of hospital facilities, the most simple for the tyro; and it may well be that this method will finally prevail.

These considerations are put aside by Bernheim as relatively unimportant and he indicates strongly that the time has come to make accurate studies of the indications for transfusion; of the dosage to be employed, of the happy moment for the exhibition of this therapeutic measure which will ensure the maximum beneficial effect. Heretofore transfusion has been practiced in many cases in which it has been of dubious value. With increased knowledge, these false indications have been eliminated and the therapeutic use of blood transfusion is being put on a sound basis.

One is keenly disappointed in not finding a chapter, devoted to transfusion in military surgery, in this otherwise excellent monograph.

Military Ophthalmic Surgery. ALLEN GREENWOOD, M.D., Major, M.R.C., U. S. A. Recently Honorary Lieutenant, Harvard Surgical Unit with the Royal Army Medical Corps, British Expeditionary Force. *Influence of Trauma on Conjunctiva and other Ocular Concomitant Diseases*, by G. E. DESCHWEINITZ, M.D., Major M.R.C., U.S.A., and a chapter on *Ocular Malingering*, by WALTER R. PARKER, M.D., Major M.R.C., U.S.A. Illustrated. Philadelphia and New York: LEA & FEBIGER. \$1.50.

As the name implies, this is a manual for the use of medical officers, especially those near the first line stations, who are brought in contact with eye injuries. The main thought of the book seems to be to direct such early and emergent treatment as will preserve the injured eyes for future plastic and reconstructive work and enable the wounded soldier to get the best uses of his eyes after being brought to the hands of the ophthalmologic surgeon at the base hospital. To pursue this object most effectually the author suggests the establishment of separate hospitals to which this class of injuries can be removed rather than an ophthalmic division at several hospitals where the number of cases is smaller and the facilities for handling them inadequate. The methods employed have all been tried out in the British Army hospitals and their value proven.

An interesting and very instructive chapter on trachoma, by Dr. De Schweinitz, is included. The differential diagnostic points between this disease and other forms of conjunctivitis are described in some detail as well as the better methods of treatment. This section of the book is one that would appeal to every practitioner in civil life as well as to those in the service.

There is also included a chapter on malingering by Dr. Parker.

International Clinics. A quarterly of illustrated lectures and especially prepared original articles by leading members of the medical profession throughout the world. Edited by H. R. M. LANDIS, M.D., *Volume 4*, Twenty-seventh series, 1917. Philadelphia and London: J. B. LIPPINCOTT COMPANY.

Volume 4 contains a large number of clinical reports and articles which have a very general interest. There are some very timely articles dealing with military topics, of which the clinics of Dr. Albee and the paper of Dr. Froger are deserving of especial mention. These are all well and lucidly written and are illustrated with numerous and appropriate drawings and photographs.

A communication of Dr. William A. Steel deals with the treatment of pyemia and septicemia by transfusion of immunized blood. The conclusions are worth quoting:

1. Transfusion of blood from self-cured cases has a curative action on patients suffering from chronic septicemia.

2. The infection from which the donor has recovered should correspond clinically and bacteriologically to the infection by which the recipient is being overcome.

3. The transfused blood is used up in about five days, and a second dose should be given at that time and repeated as often as the clinical symptoms warrant.

4. The immediate improvement is so marked that one gets a false sense of security, which will be shattered by a relapse if repeated transfusions are not persisted in.

5. It offers a promising method of cure in the usually fatal chronic septicemia and pyemia conditions.

Books Received

Evolution ve la Pl Aie de Guerre. PAR A. POLICARD. *Precis de Medecine & De Chirurgie De Guerre.* MASSON & CIE EDEITEURS. 1918.

Premieres Heures du Blesse de Guerre. PAR P. BERTIN ET A. NIMIER. *Preface Du Medecine Inspecteur General Jacob. Precis de Medecine & De Chirurgie de Guerre.* MASSON & CIE EDEITEURS. 1918.

Les Blessures du Cerveau. PAR CHARLES CHATELIN. *Preface Du Pierre-Marie Deuxieme Edition. Precis de Medecine & de Chirurgie.* MASSON & CIE EDEITEURS. 1918.

The Surgical Clinics of Chicago. February, 1918. Volume 2—Number 1. With 73 illustrations. Published Bi-Monthly. W. B. SAUNDERS COMPANY, Philadelphia & London.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics, Materia Medica and Diagnosis in the Jefferson Medical College, Philadelphia. Assisted by LEIGHTON F. APPLEMAN, M.D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia. March 1, 1918. LEA & FEBIGER, Philadelphia, New York, Six Dollars Per Annum.

Modern Urology. In Original Contributions by American Authors. Edited by HUGH CADET, M.D., F.T.C.S., Chief of the Genito-Urinary Department of the Massachusetts General Hospital; Assistant Professor of Genito-Urinary Surgery in the Harvard Medical School, Boston, Massachusetts. VOLUME 1. General Considerations—Diseases of Penis and Urethra—Diseases of Scrotum and Testicles—Diseases of Prostate and Seminal Vesicles. Illustrated with 368 Engravings and 7 Plates. VOLUME 2. Diseases of the Bladder—Diseases of the Ureter—Diseases of the Kidney. Illustrated with 264 Engravings and 10 Plates. LEA & FEBIGER, Philadelphia & New York, 1918.

Thyroid and Thymus. ANDRE CROTTI, M.D., F.A.C.S., LL.D., formerly Professor of Clinical Surgery and Associate Professor of Anatomy at Ohio State University College of Medicine; Member of the American Medical Association, Ohio State Medical Association, Columbus Academy of Medicine, American Association of Obstetricians and Gynecologists, Society for the Study of Internal Secretions. Octavo; pages 556+10; with 96 illustrations and 33 plates in colors. Philadelphia and New York: LEA & FEBIGER, 1918. \$10.00.

Sanitation for Medical Officers. EDWARD B. VEDDER, M.D., Lieut.-Col., Medical Corps, U. S. A. Illustrated; Duodecimo; 206 pages. Philadelphia and New York: LEA & FEBIGER, 1917. \$1.50.

Progress in Surgery

A Résumé of Recent Literature.

Blood Pressure in Wound Conditions. JOHN FRASER and E. M. COWELL, France. *Journal of the American Medical Association*, February 23, 1918.

Fraser and Cowell report the results of their studies of blood pressure in various wound conditions. The readings were made mostly in the casualty clearing stations near the firing line, though some were made in the trenches and in the advanced dressing stations of field ambulances. The "Riva Rocci" mercury manometer was mostly used at first, but lately they have been using a spring sphygmomanometer which has the advantage that it can be used under more conditions and is generally more adaptable. In certain cases with a hardly perceptible peripheral pulse the stethoscope was employed. A number of control readings were made on healthy soldiers with a wide range of results. The systolic pressure was generally lower than one would have accepted as normal in civil practice, and they observed that among soldiers engaged in the actual fighting the average systolic pressure was higher than among the relief parties of the same regiments who were only exposed to occasional fire. They found two distinct groups of blood pressure conditions in recently wounded men. The hypertension group with systolic pressure varying from 150 to 160 or even 170 mm., and the hypotension group (with primary shock), with pressure varying from 40 to 90 mm. In the first group the pressure gradually falls and in the case of a normal recovery, with rest in bed, remains at a steady level between 110 and 120 mm. In the second group the patients are cold, often pulseless, and the anatomic lesion seems sometimes to be entirely out of proportion to the physiologic reaction. If hemorrhage occurs secondary shock develops and the pressure continues to fall. Following the application of treatment, with rest and warmth, the blood pressure may become partially re-established. With head wounds without penetration of the skull there was usually a high pressure, but with penetrating wounds the writers observed that the diastolic closely corresponded to the systolic pressure with a correspondingly low pulse pressure. Perforating wounds of the skull were followed by both high and low pressures, the former when the through and through wounds involved the ventricles and were accompanied by hemorrhage into the cavities of the ventricles. The low pressure cases were observed with more or less superficial wounds of the brain, especially in the frontal and occipital regions. The blood pressure subsequent to wounds of the head is apt to be unstable and if operation is performed before it becomes stable disaster is liable to ensue. A summary is given of the abdominal wounds observed and they find that in patients seen within six hours of being wounded, if there is an intraperitoneal injury of a hollow viscus, the blood pressure is low. When about ten hours have elapsed and the primary shock has passed off it rises, to fall again later with a shock-like condition due to sepsis and loss of blood. Wounds of solid viscera of moderate severity appear to be associated with a relatively high blood pressure. Perforating wounds of the viscera which do not open into the peritoneal cavity are associated with practically normal blood pressure. Large wounds of the parietes are generally associated with a lower blood pressure than smaller wounds. Opening the abdomen and setting free a large amount of blood caused rapid fall of pressure, but if the abdominal cavity did not contain much blood the opening was followed by a temporary rise followed by a fall in a few minutes. Large open chest wounds with entrance and exit of air show profound drop of pressure, while those of uncomplicated closed wounds show normal pressure. When severe internal hemorrhage has occurred and the patient has been exposed to cold or has been infected hypotension is present and progressive. Compound fractures of the lower extremities are generally associated with a fall of pressure when seen in the casualty clearing stations. The blood pressure varies with the amount of hemorrhage, and the compound fractures of the upper extremities closely follow the same

rule. Face wounds seldom affected the blood pressure unless compound fracture of the face bones had occurred. Multiple wounds of the body and extremities generally lowered the blood pressure. The effects of various transfusions were noted. The authors were disappointed with their results from the use of physiologic sodium chloride. More satisfactory findings followed the use of Ringer's solution and its modifications. The use of colloidal solutions causes a rise almost invariably within a few minutes. They have had no experience with glucose solutions. Excellent results followed direct blood transfusion in cases of profound shock with hemorrhage, an injection of the calcium hypertonic gum solution causes an immediate rise of pressure in cases complicated by toxemia which may tide the patient through an operation. In milder cases of shock and hemorrhage an infusion with hypertonic saline is useful. A number of pressure charts showing the behavior of the tension during convalescence were obtained. An uncomplicated wound maintaining steady pressure was found favorable, and a steadily rising or maintained high pressure reading may be taken as a favorable prognostic sign. Eight charts and five tables accompany the article.

The Initiation of Wound Shock. E. M. COWELL, France. *Journal of the American Medical Association*, March 2, 1918.

First defining the terms primary wound shock and secondary wound shock, the first ensuing within twenty minutes or more after receiving the wound and the second following exposure in a long carry in the cold or the onset of toxemia or the presence of continuous slight hemorrhage, Cowell describes his method of obtaining the later phases of fully developed wound shock at a series of temporary posts along the line of the carry, each equipped with an observer and instruments to make clinical observations and test the blood pressure at short intervals. A good deal of light is shed on the pathogenesis of wound shock by a consideration of the conditions of life of a soldier on the firing line. In areas behind the trenches the conditions are practically normal. The average systolic pressure of an unwounded man is from 110 to 120 mm. with a diastolic of from 57 to 80 mm. and a pulse pressure of from 35 to 40 mm. In the front line trenches, however, the conditions of existence are for the most part unfavorable. The soldier is subjected to long spells of hard physical labor, often accompanied by profuse sweating, short and usually interrupted sleep, and only a scanty supply of water, and in the firing line and during battle these conditions are accentuated. For a large part of the year exposure to wet and cold are to be reckoned with. Thus the man, who may be hit at any time, is likely to be in a state of fatigue, with a tendency to concentration of plasma, sluggish peripheral circulation and accumulation of waste products of muscular metabolism. The urine of such men is dark, scanty, and loaded with phosphates. Observations have shown that the blood pressure in such cases is a little above normal, and rises still higher with increased activity. Similar observations could not be made in the heat of battle, but there is no doubt that these physiologic conditions were all present, only in a much greater degree, affording important pre-wound factors in the initiation of wound shock. Shock following trivial wounds, which cause only slight damage to the tissues, that following moderately severe injuries, and that following serious wounds are considered separately by Cowell. As regards the first mentioned, he refers to the psychic factor and the increased supranal activity. The circulation is better maintained by the raised blood pressure in most cases. In the excitement cases, the pressure subsides rapidly with quiet and rest. In moderately severe wounds primary wound shock does not occur within a few minutes, and if proper care can be given, secondary shock may be averted. As the factors of cold, toxemia, pain, anxiety or lack of water are allowed to come into play secondary wound shock develops within a few hours. In some of the severely wounded cases and the unavoidably fatal ones, symptoms develop immediately, and hypotension is found from the beginning. This is primary wound shock, which unless recovery first occurs merges into secondary wound shock. In the slighter cases recovery from primary symptoms is rapid, but then exposure and other factors may come into play and secondary wound shock may become established.

A Study of Anteoperative and Postoperative Blood Counts in Non-infective Surgical Conditions.
 JOHN L. MURPHY. *Annals of Surgery*, February, 1918.

In surgical cases undergoing operation without infection the white cells increase in number, and about six hours after operation have more than doubled. The response is due almost entirely to an increase in the number of the polymorphonuclear cells. There is a trivial rise in the number of red cells after operation, but in the subsequent ten days this is followed by a progressive anemia, with an average loss of about one-half million cells.

The white cell count may be expected to fall rapidly in clean cases and reach normal on the fourth day. In infected or contaminated cases it will fall much more slowly. The latter, however, have no influence on the initial rise. The height of the blood count depends on the severity of the trauma, the number of sutures and ligatures, the loss of blood and the duration of anesthesia. Normal subjects induce higher counts than abnormal types.

Observations on War Wounds of the Knee-Joint Among French Soldiers. J. R. JUD. *Surgery, Gynecology and Obstetrics*, February, 1918.

Wounds of the knee-joint in modern warfare maintain the same importance and gravity that have existed since the birth of surgery. The resisting powers of the synovia and their ankylosing tendencies vary in individuals.

In the presence of an infected projectile and infected joint fluid, the synovia may remain uninfected for a brief period. Fissures extending to the articular surface are important and are often unrecognized. Secondary infection of the ankle-joint sometimes occurs unexpectedly and is a grave complication.

The earlier methods of non-interference, drainage tubes, and wholesale removal of bone were accompanied with disastrous results. The mortality has been greatly reduced by improved methods of treatment. Perforating wounds traversing the joint should be treated by puncture, compression, and immobilization. For wounds with foreign bodies included, with or without bony lesions, early intervention is the secret of success.

The new era in joint-surgery calls for arthrotomy within forty-eight hours, the removal of the projectile, foreign bodies, and loose fragments, the excision of the path of projectile, the cleansing of the joint and suture without drainage. Extensive bony lesions demand primary resection. This modernized treatment not merely is more effective in preserving limbs and their functions, but decreases the period necessary for hospital attendance.

The General Principles of Treatment of Wounds of the Knee-Joint from Projectiles in Warfare. CHARLES J. MURPHY. *Annals of Surgery*, February, 1918.

Immediate amputation is indicated: (a) when there is extensive destruction of tissue; (b) when the popliteal vessels are badly torn; (c) when the leg is gangrenous; (d) when a purulent arthritis is complicated by secondary hemorrhage from the popliteal vessels.

The important principle to follow is through disinfection and drainage. When no fracture is present arthrotomy is generally sufficient; when fractures are present resection is indicated. The wounds should never be sutured, but should remain wide open to prevent subsequent sepsis. When amputation is deemed necessary—because of extensive tissue destruction, etc.—amputate as low as possible in the thigh by the circular method and leave the stump wide open.

If there is no temperature when first seen it is wise to be conservative. Occasionally a missile lying outside of the joint and surrounded by infected tissue may give rise to the same picture as an arthritis; these should be carefully differentiated.

Bone Transplantation in the Surgical Treatment of Paralytic Feet. JOSEPH E. FULD. *Annals of Surgery*, February, 1918.

With the object of securing a bony ankylosis in a position of equilibrium, a bone graft is inserted which passes through both malleoli and the body of the astragalus.

Value of the Caliper in the Obtaining Extension in Compound Fracture of the Femur. F. A. BESLEY. *Chicago. Journal of the American Medical Association*, January 12, 1918.

In a preliminary report on the value of the caliper in obtaining extension in the compound fracture of the femur, Besley speaks of the inadequacy of most of the methods used in obtaining extension in cases of fractured femur. The multiplicity of methods used, he says, gives direct evidence of the fact that no one has been eminently successful. Experience has taught us that no foreign body should be applied to the fractured ends of bone in a recent compound fracture. He asks what shall be done with the compound fractures of the femur seen in war surgery. We have to deal, first, with a large open wound, and, secondly, with the reduction and retention of the fractured bone. If treatment can be immediately begun after the patient is wounded, the ideal method would be to clear out the wound of all foreign bodies and excise the contused, lacerated and devitalized tissues, so as to render the wound as sterile as possible. After this, the wound should be closed immediately, or within two days, with sutures inserted at the time of the operation, but left loose to be tied later. If we could obtain a primary union, as is often the case, we are still confronted with a simple fracture and our problem is to obtain extension sufficient to counteract the pull of the strong muscles of the thigh. More extension is required in the robust soldier than in the less developed civilian. The large number of cases of compound fracture seen by the writer came to him soon after the infliction of the wound. Nearly all had been dressed at the front and placed in a Thomas splint or something of the kind, and traction had been secured by adhesive plaster and Sinclair's glue. The traction is usually maintained by means of a rubber band attached to the bottom of the splint. At first, much difficulty was experienced in maintaining traction on the distal fragment. The Steinmann nail was used with good results in fractures of the upper third of the femur, but the writer and his associates hesitated to use it in the lower third. Some years ago, Ransohoff advocated the use of the caliper or ice tongs, applied to the condyles of the femur. This device the writer had used a few times in civil practice, and it had appealed to him strongly. The difficulty was in obtaining proper devices. Lieut. C. J. Glaspel devised a very satisfactory caliper out of meat skewers. The method of application of this crude device is described in detail, with illustrations. The writer advocates its use very strongly, calling it the best method of securing traction in all compound fractures of the femur met with in war practice. He regrets that up to the present time he could not employ the roentgen-ray to show his end-results, but these will be secured later and presented in a future article. Of course, no plan of treatment can be outlined and carried out completely unless it is accurately controlled by roentgen-ray observations. At the time of writing, he has about forty cases under treatment by the caliper method, and the patients obtain more comfort than would otherwise be possible by any other practicable means of traction.

A New Operation for the Substitution of a Thumb. J. L. JOYCE. *British Journal of Surgery*, January, 1918.

A thumb was lost as a result of a gunshot wound and in its place the ring finger of the opposite hand was substituted. The steps in the procedure were as follows:

1. Preparation of the bed for the reception of the new metacarpal bone, and exposure of the proximal ends of the divided tendons of the thumb.
2. Dislocation of the ring finger of the opposite hand at the metacarpo-phalangeal joint, involving division of the soft tissues at the base of the radial side of the proximal phalanx, division of the extensor and flexor tendons, and the preservation of a nutritive flap on the ulnar side of the finger.
3. Fixation of the new metacarpal bone (proximal phalanx of the ring finger) in its bed, union of tendons and nerves, suture of incisions and fixation of the two hands in apposition.
4. Division of nutritive flap—two months later than 1, 2 and 3.

An excellent result and a useful finger was obtained.

The Rationale of Radiotherapy in Uterine Hemorrhage. J. A. CORSCADEN. *American Journal of Obstetrics*, February, 1918.

The x-ray destroys the Graafian follicle, which in turn controls menstruation, and hence menstruation can be controlled by the use of the x-ray. Similarly, abnormal uterine bleedings can be controlled, as the majority of them arise from disturbances in the menstrual mechanism, and not to local mechanical causes.

Radium also possesses a local cauterizing effect on the uterine cavity. In women of the late child-bearing period radiotherapy is the procedure of choice. In girls radiotherapy should be used as a late procedure. The induction of an artificial menopause for economic reasons is possible. Whether it is justifiable or not is a matter for discussion.

In fibromyomata associated with bleeding, the same result, amenorrhea, follows, as it does in uterine bleeding, from a grossly normal uterus. The fibromyomatous mass shrinks as a result of the radiotherapy to a marked degree, often to an extent that permits the mass to escape palpation. Unless the fibromyomata cause symptoms, they should remain untreated. Radiotherapy is the treatment par excellence, when hemorrhage is the only symptom, because it reduces the condition to the symptomless class. Since the amenorrhea should be permanent, radiotherapy is particularly indicated for women of thirty-eight years or over, while it should be restricted more and more as the age is lower. Where mechanical symptoms predominate they are best treated mechanically, i. e., by operations.

The uterine bleeding as treated in eight girls was controlled with varying success in all cases. In three the menses became almost normal; in five an amenorrhea of varying duration was induced. In one instance there were severe hot flushes for a period covering nine months.

Radium appears to exert the same influence as x-ray therapy. The advantage of radium over the x-ray is that one treatment carried over twenty-four hours usually suffices for results. With the x-ray, the treatment is spread over six to ten weeks. Uterine hemorrhage from any cause may be stopped by the intrauterine application of radium. Hemorrhage from disturbed menstruation with or without fibromyoma may be controlled by the x-ray. Practically all fibromyomata will shrink to a satisfactory degree after radiotherapy, while no harm results.

All cases of hemorrhage from a grossly normal uterus in women of thirty-eight or over should be treated by radiotherapy after carcinoma has been ruled out by a diagnostic curettage. In younger women radiotherapy should be used only as a late resort. For uterine hemorrhage associated with fibromyomata of the uterus, radiotherapy is indicated, if symptoms from mechanical causes are absent and the woman is over thirty-seven years of age.

Pregnancy in Cases of Tuberculosis of the Lungs.

JOSEPH WALSH. *American Journal of Obstetrics*, February, 1918.

Walsh argues that pregnancy does not exert the harmful influence upon tuberculous women that is alleged. Thirty-eight patients who were observed within a period of fifteen years gave birth to a total of fifty children. Only five mothers died. His experience is at least as favorable with respect to mortality statistics as that of authors who practice abortion, sterilization, etc., for pregnant tuberculous women. Many children were saved who otherwise would have been sacrificed before viability.

His conclusions are as follows: Active cases of tuberculosis should be advised against marriage; quiescent cases especially after treatment and education bear the duties of marriage sufficiently successfully to warrant the risk of marriage. Patients with quiescent conditions, if pregnant, are to be placed upon a rigid regimen and may be expected to come through the pregnancy with but little, if any, advance of the tuberculosis. Women with active tuberculosis, if they become pregnant, run a definite risk, but the operations for abortion, especially those associated with sterilization, have a mortality making the continuation of the pregnancy more desirable and safer.

Version, with a Report of 200 Additional Cases Since September, 1916. IRVING W. POTTER. *American Journal of Obstetrics*, February, 1918.

It is interesting, though rather astounding, to read what can be done with an obstetric procedure which is usually regarded as having very definite limitations. Potter reports two hundred versions performed within a period of one year, as an addition to the five hundred he previously reported. There was no material mortality. Eighty-five were performed in primipara and one hundred and fifteen in multipara. His chief indication appears to have been occipito posterior presentations (126 instances—40 right occipito posterior). Five times in R. O. A. and three times in L. O. A. He performed version in preference to using forceps. A large variety of conditions make up the remainder of the indications for version. Sixteen children delivered were still-born, not as the result of the version, but because of intrinsic causes lying in either an abnormality of fetus itself, of the placenta or in prolapsed cord.

Potter maintains that version lessens the shock of labor, decreases the dangers due to pressure from and upon the head of the child, and is superior to prolonged labor and instrumental delivery.

[While no one will doubt Potter's report and everyone will admire his results and daring, the same will still remain a feat performed by an expert who has specialized in this well-established and well-tried obstetric maneuver. There will be little imitation by other obstetric specialists, much less by practitioners in obstetrics. It is well to bear in mind the brilliant success of version when properly executed as an alternative in certain obstetric emergencies where judgment would ordinarily lean toward more conservative measures. As a procedure of choice, to be employed in routine practice, it will scarcely attract a following in the profession.]

Premature Separation of the Normally Implanted Placenta. ARTHUR H. MORSE. *Surgery, Gynecology and Obstetrics*, February, 1918.

Two cases of premature separation of the placenta are reported by Morse, in one of which he examined the extirpated uterus and in the other a complete autopsy examination was made. In both instances the fetus was dead.

The striking feature was the cyanotic appearance of the uterus, which was tense, firm, and had lost its contractility. In the case which recovered there was concealed hemorrhage, while in that coming to exitus, hemorrhage was both frank and concealed. The chief pathological findings were vascular extravasation intramurally with the mural veins distended, with or without thrombosis being evident.

Morse reproduced the lesions and the same clinical result by ligating the total effluent veins of one horn of the uterus in a pregnant rabbit, the other pregnant horn remaining untouched as a control. In each experiment there resulted rapid cyanosis of the ligated horn and partial or complete separation of the placenta, with death of the fetus. The musculation on section showed the same alterations observed in the human subject.

While the cause of thrombosis of the uterine veins is not definitely known, Morse suggests that constrictions of the vessels may follow a certain degree of torsion of the uterus observed in multipara with poor abdominal support arising from lax abdominal walls. Firm support is needed by this type of women to prevent the possibility of displacement with the resulting pressure on the veins.

Report of Nineteen Cases of Hyperplasia of Thymus Gland Treated by the X-Rays. JULIEN E. BENJAMIN and SIDNEY LANGE. *Archives of Pediatrics*, February, 1918.

This study comprised one year's observation of all kinds of cases in a children's department. Of 125 cases seen during this time, nineteen showed evidence of an enlarged thymus. The clinical diagnosis of an enlarged thymus was confirmed by x-ray examinations. X-ray therapy was then carried out in each case. The child was kept quiet by sand bags placed upon each extremity. At intervals of one week, treatment was given. This consisted of a routine exposure of 25 milliampere-minutes at the target

skin distance of approximately nine inches. The treatment of hyperthyroidism by local treatment may be noticed.

Some Observations on the Surgery of the Thyroid Gland. W. O. GATCH. *The Journal of the Indiana State Medical Association*, January, 1918.

Gatch likes to employ a skin injection of adrenalin solution as a clinical measure of estimating the degree of hyperthyroidism. The extent and duration of local reaction would appear to be in direct proportion to the amount of thyroid secretion. Gatch also determines whether or not is safe to operate on his thyroidic patients by estimating the functional capacity of the heart, and in some doubtful cases he makes an electrocardiographic examination. Although the heart in hyperthyroidism is not diseased organically, but only over-stimulated, still this over-stimulation may produce heart insufficiency. Where such insufficiency exists, it is imperative to see clearly operative indications and contraindications. The patient is given a long rest before operation. He receives an expert anesthesia. The operation is systematically performed with strict attention to hemostasis. A portion of the gland is removed. Gatch points out that mania in a hyperthyroid patient means imminent fatality.

The Surgical Treatment of Pernicious Anemia. CHARLES A. P. WESS. *The Canadian Medical Association Journal*, February, 1918.

Treatment for this condition must accomplish three things: (1) remove the source of infection; (2) make up for the lost blood by transfusion of whole blood, and by stimulation of the blood-forming organs; and (3) stop hemolysis.

The author advocates surgical treatment by transfusion and splenectomy. Cases that receive this treatment from the very earliest do best. Transfusions are first done, the spleen is removed, and subsequent transfusions are employed from time to time. It is important to search for any possible foci of infection in order to remove them. At the time of splenectomy, it may be necessary to remove also the appendix and gall bladder, as these organs may be the site of infection.

Henry states that the duration of the disease is shorter under medical treatment than under surgical treatment by transfusion and splenectomy.

A New Incision for Exposure of the Lower Abdomen and Pelvis. JOHN W. CHURCHMAN. *Annals of Surgery*, February, 1918.

The incision has two limbs: one running vertically in the median line towards the pubis, and the other at right angles to, and from the upper end of, the first limb. The rectus muscle is divided transversely, the external oblique muscle is separated in the direction of the fibres, and the internal oblique and transversalis are divided in the line of the skin incision. In suturing, the fascial layers are overlapped. A second transverse limb can be added on the other side, giving a T-shaped incision.

Intestinal Obstruction: An Experimental Study. BARNES BROOKS, HARRY W. SCHUMACHER and JOHN E. WATTENBERG. *Annals of Surgery*, February, 1918.

A series of experiments is described in which it is shown that the toxic bodies which cause death in intestinal obstruction are produced in the obstructed loops. The intestinal obstructions are produced in the obstructed loops. The intensity of the poisonous effects depend on the ease with which the toxic fluid is absorbed, and it is shown that absorption takes place only through damaged mucosa. No absorption takes place through healthy bowel wall.

The Etiological Relationship of Benign Ulcer to Carcinoma of the Stomach. ABRAHAM O. WILENSKY and WILLIAM THALHEIMER. *Annals of Surgery*, February, 1918.

The only criteria for judging this relationship, which are at present available, are of a pathological nature and the microscopical picture is often such as to make it difficult, if not impossible, to determine with accuracy which of the two lesions is primary and which is secondary.

It is probably that lesions, in the largest percentage of the cases, begin and end as one or the other of these two conditions. In only a very small percentage—1 or 2 per cent—was it at all possible to say that carcinoma had been engrafted on a benign lesion. Even in these the evidence was not conclusive.

Roentgenological Studies in the Healing of Gastric and Duodenal Ulcers. W. W. HAMBURGER, Chicago. *American Journal of Medical Sciences*, February, 1918.

Starting with the repeatedly confirmed observation of Haudek, that ulcers of the lesser curvature can be diagnosed in the x-ray plate by the presence of a small rounded projection in the shadow, Hamburger made a number of observations to determine whether this shadow disappeared after either surgical or medical treatment. He found that in some cases the plates showed a progressive disappearance of this pocket and this disappearance was associated with accompanying clinical improvement and cure. Such evidence is strong presumptive evidence of healing of the ulcer. In certain other cases the niche remains or even grows larger. In such cases the question arises as to whether they are being correctly treated, or whether the ulcer is of specific or cancerous origin. Perhaps, in such cases, the patient must be treated surgically. On the other hand, complete disappearance of the niche cannot be interpreted as complete, normal restitutions. The failure of normal peristaltic waves to continue through the ulcer area is positive evidence of a remaining pathological condition. Hamburger's studies indicate an interesting and important field for study, and may perhaps serve to differentiate the cases appropriate for either medical or surgical treatment.

Congenital Atresia of Small Intestine. FRANK VANDER BOGERT. *Archives of Pediatrics*, January, 1918.

The author adds a fourth case to three previously described. A full-term baby was born, apparently normal in appearance. Abdominal distention appeared within the first day, and in the second night, intestinal peristalsis was observed. The baby vomited soon after birth. Oil given by mouth was returned within five minutes. On the third day, the vomitus became fecal. The bowels did not move. Repeated enemas resulted in the discharge of a large mucous cast of the bowel, filled at its upper portion with a substance resembling meconium, except that there was no bile reaction. The baby died at the end of its fourth day.

Autopsy showed a complete obstruction, the small gut ended abruptly twenty-five inches above the ileo-cecal valve.

The author emphasizes the value of the absence of bile in the stool in this condition. He believes this is evidence of a complete obstruction and that immediate operation should be carried out.

Inflammatory Rectosigmoidal Strictures, Hitherto Undescribed. GRANVILLE S. HANES. *Interstate Medical Journal*, January, 1918.

Hanes describes a type of stricture with the following characteristics:

- (1) It always involves the rectosigmoidal juncture, extending above or below this point.
- (2) There are wart-like excrescences that protrude from the surfaces of the strictures; these are very soft, friable and detachable. When destroyed, however completely, they return.
- (3) They bleed upon the slightest manipulation. The mucosa is very granular.
- (4) There is a characteristic grayish-white exudate all along the stricture surface.
- (5) The patients have distressing diarrhea and tenesmus.
- (6) The strictured portion may involve four or five inches of the intestine.
- (7) There is a thickening of the layers of the intestinal wall.

Hanes feels that this condition is produced by some specific bacterium. The author has performed colostomies in three of the eight cases which came to him with this condition.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

JUNE, 1918.

No. 6

CRANIAL SURGERY.*

ROBERT T. MORRIS, M.D.

NEW YORK CITY

I believe it very important to observe in cranial surgery, as a rule, the dictum, when in doubt operate. If one is in doubt about operating in the case of recent injury without shock, it is indeed difficult for him to come to a conclusion unless he has means for determining that intracranial pressure means progressing hemorrhage, and in such a case, even in the presence of the shock, he must operate, even against this dictum in surgery.

In some cases we shall have added a psychotic feature which will be confusing if we try to follow the dictum. I saw a little girl recently struck by an automobile in the temporal region, causing contusion of the scalp; the patient was unconscious for a few hours and vomited. I saw her about ten hours later. At that time she appeared to be partly apathetic, threw herself always to the left, with arms and legs sharply flexed and eyes deviating to the left, but there was a normal pulse, normal respiration and normal pupillary reflex and no disturbance of the sphincters. I had no means at that time for determining the question of increased intracranial pressure, but I felt that a certain hysterical feature was present in the case, there was something in the manner and bearing of the little girl which indicated that feature, and on getting the family history, which was neurotic from one side of the family, it seemed to me that this very marked tendency of the child to snap into a position of contraction of arms and legs and to lie on the left side represented in part a psychotic feature rather than brain injury, excepting for meningeal contusion. She made very good recovery in the course of about a week—a progressive recovery, without anything in particular having been done for her.

In cases of recent brain injury with fracture of the skull, we sometimes hear it said that in all probability there is nothing more than a brain clot present, a dural clot; but in cases in which we are dealing with a sub-dural clot we have a very serious menace to the integrity of the brain, for the reason that the pressure made by a clot, even though aseptic,

causes permanent cell injury; the gray matter becomes fatty, and there is a replacement by connective tissue of the clot so slowly that brain parenchyma changes, brain cortex changes take place in a very injurious way. Ordinarily an aseptic blood clot undergoes slow replacement by cells that are nearest to the clot and we may ordinarily wait for absorption of blood clot in any part of the body excepting in connection with the brain or cord, and there the secondary changes from its presence are so serious in their nature that we should operate for the removal of simple clot. If there is fear of arousing a new hemorrhage,—I have often heard that question brought up,—it seems to me that we have a number of resources for stopping the new hemorrhage without making a very extensive operation. Even an artery as large as the middle meningeal may be controlled without much difficulty, if we take a bar of lead and bend it in U form, so that one arm of the U extends within the cranium, and then when that is adjusted over the bleeding point, a little wedge of gauze under the external arm of the U of lead brings pressure enough to bear and we may stop the hemorrhage very quickly, removing your lead bar next day, if you please.

In the case of depressed fracture of the skull—some years ago—while turning up the bone flap for the purpose of removing dural adhesions, I got into the superior longitudinal sinus immediately, because of the position of the fracture, and one of my friends in a discussion of the subject afterward asked how I stopped the hemorrhage. I said, "Why, I did it so quickly, I don't remember." It was really stopped in this way: by placing a periosteal elevator in such a way as to make pressure against this very hard, firm wall of the superior longitudinal sinus, then making a fulcrum with some other instrument and then fastening down this periosteal elevator as a lever. We have so many ways for stopping a hemorrhage that we need not fear this secondary hemorrhage when it becomes necessary to remove a clot.

In this connection, after the blood clot has been removed at the site of the fracture of the skull, we frequently have dural adhesions persisting for years or throughout the patient's life, which are not given a sufficient degree of attention by the profession as a rule. Very many cases of persistent headache, of nervous excitability, of epileptic seizure are due to

* Read before the New York and New England Association of Railway Surgeons, November 8th, 1917.

the presence of dural adhesions following an old cranial injury of such a long standing that the practitioner frequently does not realize the importance of dural adhesions. Dr. Hammond has been particularly keen in recognizing these cases and has sent me a good many and our results in some cases have been better than he had anticipated, and in others nothing was gained; but it is well to keep in mind the fact that dural adhesions following almost any sort of a cranial injury may give rise to symptoms years and years after the injury.

In one patient whom I presented at the Surgical Society last year, a young girl with cyclical mania, very destructive and requiring attendance continually, the question arose as to whether there was any connection between her condition and a brain injury which she had received some years before, a slight fracture of the skull, and the only basis for that supposition was the fact that when she had an attack of acute mania and was very destructive, she would walk about holding one hand always to the right side of her head. In going to tear down a lamp, she would rush to the lamp and tear it down and hold her hand on the right side of her head. I turned down a flap of the skull, found dural adhesions, introduced gold-leaf and she made a complete recovery. Here was a patient who, after being under the care of psychiatrists who had said the case was hopeless, was completely cured by the separation of dural adhesions; and yet in that case the only evidence that we had upon which to proceed was the fact that at times of acute mania she would put her hand to the point where she had the injury of the skull years before.

In regard to the question of preventing recurrence of dural adhesions, I have employed many resources; I have felt that gutta percha tissue would sometimes result in re-formation of adhesions. Cargile membrane would seem to be ideal, but it is difficult to introduce the Cargile membrane very smoothly. Curiously enough, I had occasion some time ago to reopen a skull for the purpose of looking for further dural adhesions about a year after the introduction of Cargile membrane and there, if you please, was the square just as nearly intact as when it was introduced. Under ordinary circumstances this would have undergone absorption in a very few days, three or four days; a year after it was intact in this case; there were no adhesions, however, over the area covered by the Cargile membrane. Gold-foil is pretty good, and one may prepare that by getting packages of gold-foil at the art stores, gold and paper, alternate sheets, and this may be sterilized by dry heat.

The question of the extent of injury is one which it is difficult to decide sometimes at the moment, when we see a patient for the first time. According to Davaine's law, the fracture is always at a line of expansion, not at a line of compression. A very small fracture of the external table of the skull may mean that we have a large fragment of the internal plate thrown in upon the brain, and this gives an added damage because of the hypodynamic force of pressure upon the brain. Sometimes the slow development of symptoms after an apparently slight injury may be very misleading.

A young man not long ago was struck by a base-ball in the temporal region. He was inclined to keep on playing, but was persuaded to leave the field; he felt dizzy. He went to one side and took his seat upon the bleachers and in the course of about an hour he began to complain and died. This was clearly a case of rupture of the middle meningeal artery, of the sort that should have been recognized by any surgeon on the field, but it was not, and the one who made the autopsy subsequently told me of his surprise that any man could have lived for fifteen minutes with the degree of hemorrhage going on beneath that skull, and yet the symptoms came on so slowly that no surgical attention was called, although it was near enough at hand.

Then again, after apparently trivial fractures we may have very little disturbance for weeks and suddenly a brain abscess may appear because of the separation of the internal table that has made a point of least resistance to bacterial invasion from the blood current and given us our abscess there three or four weeks, or more, after a comparatively trivial injury. Therefore I am more and more impressed with the idea of following the dictum: when in doubt operate. We shall so often find that we have a clot to care for, a hemorrhage to stop, a fracture of the inner table which may give rise to late appearing symptoms of serious character, but I am more and more impressed with the idea that we are not inclined to operate early enough unless we have at hand means for determining an increasing intracranial pressure.

In regard to fractures at the base, Dr. William Sharpe has told of his having been reprimanded for not sending a patient with a fractured skull from another hospital to Bellevue Hospital. Now I have been at Bellevue Hospital, receiving patients, and I know just exactly what that means. The patients with fractures at the base that were likely to die shortly, or in due time elsewhere, were commonly shipped off to Bellevue Hospital. I believe this: that the idea of keeping the naso-pharynx, the ear

and the nose in as nearly aseptic condition as possible has much more important effect than it is commonly believed to have.

I had hoped that the hypochlorites would offer us a good deal of help in this particular direction, in maintaining a certain approximate asepsis in cases of fracture of the base, but I believe they have not yet prepared the hypochlorites so that they can be used for any great length of time upon the mucous membranes. Otherwise we have an ideal situation for using hypochlorites, where at intervals of an hour or two, one might flush the surfaces through which infection makes its way, but I have found in fractures of the base that if we maintained approximate asepsis, the blood serum which is itself germicidal in a way, will keep the area fairly aseptic, provided that we add irrigation with some weak antiseptic not injurious to the mucous membranes.

In cases in which we are to have continual drainage of the cranial fluid in a brain injury, how are we to obtain a good protection of the brain area? If we have several layers of gauze immediately protecting the area and change the dressings outside of a first layer of iodoform gauze frequently, we shall avoid the entrance of sepsis—one or two layers of iodoform gauze first. That iodoform gauze need not be changed;^{*} it may remain for two or three or four days at a time, while we change the outer dressing of gauze very frequently, and in that way we avoid fairly well the menace of the traveling of infection through our dressings and to the brain area.

FIGHTING VENEREAL DISEASES

A public health program which attempts to fight venereal diseases without suppressing prostitution is as illogical as one which would battle smallpox without isolating victims, as illogical as one which would try to stamp out typhoid fever without providing pure water and sanitary sewers, as illogical as one which would seek to wipe out blindness without treating the eyes of newborn babies.—*The Ohio Public Health Journal*.

THEOCIN FATALITY.

W. W. Cadbury, Canton, China (*Journal A. M. A.*, Jan. 5, 1918), reports two cases of fatality due apparently to the therapeutic administration of theocin. The drug was taken from a bottle which had not been previously opened, but which has since been opened and used on other patients without bad effects. The signs of heart failure developed so soon after the patient took the drug as to make it seem certain that it was responsible. The value of theocin as a diuretic is recognized in cases attended with edema and the uncomfortable symptoms of dizziness and nausea, sometimes previously observed after its oral administration, can be avoided by the exercise of care in its administration and by dieting. No attempt is made to explain the fatal outcome in these cases.

TREATMENT OF MINOR INJURIES.*

EDGAR A. VANDER VEER, M. D.

ALBANY, N. Y.

By the term "minor injuries" I do not mean to include fractures or dislocations, but bruises, contusions, lacerations, burns, and injuries to the nerves and muscles, which may occur in any part of the body, especially the extremities.

Probably one of the most difficult problems with which the railroad surgeon has to deal is the handling of minor cases—cases which are trifling in themselves, but have great potential power for damage, unless good judgment is used. Unfortunately, many of the injured cannot be trusted to care for the slightest wound at home. Therefore it has been my custom to send these cases to the hospital for at least twenty-four to forty-eight hours, until the proper first aid treatment can be rendered and, if necessary, x-ray pictures are taken, especially if the bruise or laceration be near a joint, after which they can be returned to their homes and given further treatment at the office.

At the first dressing we do not try to do too much, simply washing out the wound, touching it up with iodine, suturing a nerve or tendon that may be lacerated, and keeping the patient in bed for twenty-four hours, with the injured part absolutely at rest.

Regarding the use of antitoxin for the prevention of tetanus, I have never advocated using it too generally. While these cases are almost invariably covered with railroad dirt and grease, still the injuries have not occurred at points where the bacillus of tetanus is likely to be found; therefore the chances of infection from that organism are very remote. I believe it unnecessary to administer the antitoxin except in cases where the location of the wound indicates it or there is evidence of soil saturation. In this assumption I am of the same opinion as Dr. Miles F. Porter, of Fort Wayne, who, in a paper read before the American Surgical Association, at the Washington meeting in 1916, opposed its use. He was sustained in his contention by some of the leading surgeons of the country.

There is danger in using too radical methods at our first treatment. We all know that nature is a wonderful healer, and if given half a chance, will save much that otherwise might be destroyed by a too hasty amputation or the removal of tissue.

*Read before the New York and New England Association of Railway Surgeons, November 8th, 1917.

It has always been my experience that if one is thorough in the cleansing of the wounds in the beginning, and generous in the application of iodine, as beneficial result is obtained as through the most complicated methods. Undoubtedly iodine is the remedy to use for these minor wounds.

Not wishing to underestimate the value of surgical technic, I believe we can do much harm by a too vigorous cleansing of the wound and that we should use the antiseptic method in preference to the aseptic in the primary treatment.

After the first forty-eight hours, when the reaction has set in and the swelling and discoloration have somewhat disappeared, the wound can be redressed and tissue, etc., can be removed if necessary, meanwhile keeping the parts moist with a good antiseptic solution, like a 1-10000 solution of bichloride of mercury. Then a dry dressing, like iodine ointment, is applied, with satisfactory results.

A difficult problem to solve is: When ought we to return the patient to work? We find in many cases a strong tendency to delay, but I believe it better to be lenient and allow three or four days grace, rather than have them resume work at too early a period.

Perhaps my attitude in this matter is governed somewhat by an unfortunate experience. At my suggestion a man returned to work after having sustained a slight cut on one finger of the right hand, with the result that an infection developed. This incapacitated him for six months and very nearly caused his death.

Under local anesthesia most of these cases can be treated at operation, and rarely is it necessary to administer a general anesthetic. Under the use of cocaine alone I have had gangrene develop due, in my opinion, to the cocaine, so that now this is guarded against with a 1-1000 solution of adrenalin.

My experience with first aid as applied by the layman has been most unsatisfactory, the person administering the first aid either having overdone the matter or it has been insufficient. I have had two or three cases of injury to the hand, the veins having been cut and a novice applying the Esmarch or tourniquet just tight enough to prevent the return flow of the blood, with the result that the patient bled very profusely from the veins and the arterial supply of blood was not stopped. Consequently, the patients lost more blood than if this method had not been used. The first aid was rendered by a fellow employee. I cannot say that I am greatly impressed with the advisability of depending

upon first aid administered by a layman, when a physician can be summoned so quickly. It is to be regretted that these accidents happen so frequently when no competent layman is about.

As a matter of precaution also, we make it a point to have a Wassermann made in every case, no matter how trivial or how severe the injury or whether syphilis is indicated either in the clinical or the personal history of the patient; and we have had some very interesting results. We have been led to this procedure by a couple of puzzling cases. One was a fracture of the upper third of the tibia which refused to knit, and it was not until after a Wassermann was made and a four plus reaction was obtained that we awoke to the fact that the man had syphilis. Proper treatment ensued, the necessary amount of callus was thrown out and the leg healed nicely. The same thing occurred in a trifling wound of the hand, which also refused to heal, granulation tissue continually occurring in the wound.

Another condition of some interest has occurred in certain cases where we have obtained, from no apparent cause, a continuous temperature in the neighborhood of 99° to 100°. There was no suppuration after the injury and the patient was in apparently good condition but for this temperature. The proper amount of stimulants, two or three times daily, brought the temperature down to normal and hastened the recovery. It is not necessary for me to say that this high temperature was due to alcoholic habits.

In cases of hematoma we find it good practice to aspirate the blood under aseptic conditions and then apply firm pressure over the injured area.

In injuries and wounds of the nerves and muscles, followed by inflammation, and where we have an inflammatory condition causing stiffening of the muscles or loss of sensation in the nerves, we have found the use of massage and electricity, as well as hot packs, very beneficial. Soaking the parts in saline baths half an hour or an hour night and morning, has also been of benefit. Local applications of mercurial ointment and in certain cases, ichthyol and some of the iodine ointments, have been of great benefit. Iodide of potassium, saturated solution, internally, also seemed to aid the absorption of the inflammatory exudate and to hasten healing.

In abscesses resulting in infection through opening up of the infected area, the insertion of a drainage tube and irrigation with a bichloride solution or a normal salt solution, proves of great benefit.

In suppuration involving the lymphatic glands,

opening of the glands, painting them with iodine, and thorough drainage, certainly facilitates resolution. In the treatment of burns we have been lately using one of the paraffin preparations, with good results.

I have been having Dr. Wm. G. Lewi treat some of these cases with the high frequency current, and he has kindly given me the following notes with regard to the results obtained through this method of treatment:—

"Conditions due to accidental injuries that are benefited by treatment with high frequency electricity may be summarized as follows:

"First: Local infections. It has been found that in local infections, especially of the closed-wound type, where there has been no suppuration, but where suppuration is imminent, treatment of the infected area with high frequency electricity will result in a cure of the condition in a much shorter time than any other treatment; and in a great proportion of cases without any suppuration. In those cases where heretofore hot-packing has been resorted to it has been observed that the time of necessary treatment; i. e., before the parts are restored to their normal condition and function, is reduced to one-half or a quarter: and whereas with hot-packing constant attention and nursing are necessary, two treatments with high frequency electricity, of from ten to fifteen minutes each a day, is all that is necessary. In the great majority of cases forty-eight hours—elapsed time—is sufficient to bring these cases under complete control, and in cases, for example, of infection of the hand or forearm, where the auxiliary glands have been involved to such an extent that any motion of the arm was painful the cases have been discharged after four or five days. In many of these cases, where under other methods of treatment, incising for the release of possible pus is resorted to, this procedure is unnecessary. The fact that treatment with high frequency electricity produces an hyperaemia (which can be exactly controlled) which is an *active* hyperaemia, replacing the passive congestion usually present in this class of cases, explains without further comment why it acts as favorably as it does.

"In cases of infection, where suppuration has taken place but to a limited extent, and where it is circumscribed, as in furuncles and boils, the results have been equally striking. In a series of more than twenty of these cases we have treated the infected swollen area for from two to three days, usually two treatments each day, have then incised the mass, expressed the pus contents, and (without

any irrigation or curetting) have dressed it with adhesive plaster—with a bit of sterile gauze directly over the opening—and they have healed by primary union, with no subsequent suppuration of discharge, excepting for a very small amount of serum on the gauze bit. These latter cases seem to prove that the treatment sterilizes the contents of these infected areas.

"In injuries to the nerves, resulting in paralysis, the results have been more than satisfactory. Also in injuries of nerves resulting in neuritis.

"In injuries to joints, where after the surgeon has done his part there is still remaining a loss or partial loss of function due, as is often the case, to a chronic thickening of the synovia or due to an exudate, the high frequency current will cause an absorption of these abnormalities and restore the function of the joint.

"Periostitis, caused by accidental means, responds promptly to this means of treatment, as does traumatic teno synovitis. A case of the latter, with almost complete loss of motion of the hand, in which the sounds over the affected tendons, heard by means of the stethoscope, on the slight motion of the hand, were like leather being rubbed on leather—almost perceptible without the stethoscope—was discharged in seven days.

"Post-operative infections, which in spite of all precautions do occasionally occur, quickly lose their infective nature and heal rapidly.

"In two cases of ununited fractures, we treated the site of the fracture, but regret to report that there was no improvement in either case.

"Neuritis, whether traumatic or constitutional, has in the great majority of cases been greatly benefited by high frequency treatment; but whether from one cause or the other, there is usually some underlying cause that must be eliminated before a cure can be effected. In many cases of the former where relief has been speedy, cases have recurred, due to the same cause as the previous attack: sometimes postural, at times because of a slight, almost unobservable, repeated blow or even push against the affected nerve. Ascertaining and removing such cause will usually, after treatment, prevent recurrence. And the same may be said of the constitutional causes that bring about, not only neuritis, but many other conditions."

Wherever we travel we encounter the sign "Safety First." As railroad surgeons, I think we ought to adopt as our motto "Conservatism First," and, so far as possible, restrain the tendency to do radical work on the injured when first seen.

"THE ANGEL OF MERCY OF THE UNITED STATES NAVY."

THE U. S. NAVAL HOSPITAL SHIP
"MERCY"

N. J. BLACKWOOD,

COMMANDING OFFICER,

MEDICAL DIRECTOR, U. S. NAVY.

A hospital ship is merely a name to many of the medical profession ashore, and when questioned about it they are unable to give a satisfactory description. This need not be the case, if it is understood that a hospital ship is nothing but a floating hospital. In other words, it is a structure containing wards, operating rooms, laboratories, and all the appurtenances that go to make a hospital ashore, only placed upon a floating platform and capable of being transported from place to place at sea. There is also some confusion in the minds of people ashore as to the distinction between hospital ships, ambulance ships and transports for wounded. These also are easily understandable, if one will liken the hospital ship to the hospital, the ambulance ship to the ambulance which brings the patients to the hospital, and the transport for wounded to the train or other conveyance that might be used to carry large numbers of sick and wounded from place to place. These three means for the care of the sick and wounded and their transportation should be definitely fixed in the mind and should not at any time be confused, because their functions and their equipment are totally different. The hospital ship, as before stated, is merely a floating hospital—a vessel equipped with everything that pertains to hospital use for the care of the sick and injured, whose duty it is to attend the fleet at its base and care for all cases of illness and injury originating in the fleet, who, with a fair degree of certainty, may be able to return soon to their duties on their respective ships. It is not a part of the function of the hospital ship to transport sick and wounded from the fleet to a base hospital ashore, nor is it a part of its function to transport sick and wounded across the ocean. Its equipment is far too elaborate for any such purpose, and the spaces allotted for the different departments are too small for the accommodation of large numbers of such casualties.

The hospital ship should remain at the fleet base to repair the personnel of the fleet and return it to its duty, and, unless it should become overcrowded by an excessive number of patients,

it should remain at that fleet base or move from one fleet base to another when the fleet itself changes its base. It should never, under any circumstances, be separated from the fleet or its main base but always should at hand to attend the serious and every-day casualties and diseases that the men of the fleet are subject to.

Its function as a hospital ship should not be expanded to take care of any very large number of contagious cases, because these cases may be great in number and of trivial importance in their severity, and the hospital ship would soon become overcrowded with these cases and its utility as a hospital for its legitimate purposes would be destroyed. No argument for this is necessary, as everyone knows who has had any experience with hospitals ashore that the ordinary hospital does not take care of contagious cases, but that special hospitals are built and maintained for the care of contagious diseases. So with the hospital ship—while it may take care of a limited number of contagious cases in order to get them off the fighting ships, it should not be required to take them for any length of time, and the contagious cases should be removed frequently by a contagious disease conveyance or an ambulance ship provided for that purpose. Every fleet should have, in addition to a hospital ship and an ambulance ship, a contagious disease hospital ship similarly equipped to the ordinary contagious hospital ashore.

The ambulance ship is the analogue of the ambulance attached to a hospital. It should be a ship of moderate size capable of carrying from 100 to 150 cases and so arranged as to be able to segregate the various kinds of contagious diseases, and also the medical, surgical and other cases that it might carry from fleet to the base hospital ashore. This ambulance ship should make periodical trips from the fleet and transfer the cases of illness and injury which are apparently destined to a long convalescence or whose convalescence will be benefited by the freer life ashore, and also to relieve any congestion which may take place aboard the hospital ship itself. The equipment of the ambulance ship is simple in character; its principal needs being a small operating room and large dressing room for renewing dressings and performing minor surgery, with large spaces for ambulant cases and a sufficient number of bunks to accommodate the more seriously ill. Its galley accommodations should be of the emergency type, but capable of quickly furnishing special diets and meals for the total

number of patients that it can carry. The trips which the ambulance ship would make, would, in all probability, be short, occupying not more than five or ten hours, and the patients, therefore, would require attention and care only during that period. A fairly large staff of nurses might be necessary but the medical and surgical staff could be comparatively small.

The transport for carrying sick and wounded long distances is altogether a different proposition from the hospital ship and occupies a position midway between the hospital ship and the ambulance ship—not requiring the equipment of a hospital ship and yet requiring more than the ambulance ship. Any large transport could be easily fitted for this purpose, requiring simply

and the *MERCY* and *COMFORT*, two ex-Ward Liners, are now in commission. I am now going to describe to you the *MERCY*, as she exists today—and as she and the *COMFORT* are sister ships, the description of one will serve for both.

The *MERCY* is a ship of about 10,000 tons displacement and is fitted with every modern appliance for the care and treatment of the sick and injured. It will be readily understood that the conversion of a merchant ship into a hospital ship is a very difficult proposition, and the ideal hospital ship will never appear until it is built from the keel up. Such a ship has been appropriated for by Congress and has been started, but owing to the necessity for ships of other character, the work and progress



Hospital Ship "Mercy."



The Crew.

in addition to its equipment for ordinary transport purposes, operating and dressing rooms of sufficient capacity, and a large enough corps of nurses and medical staff to take care of the patients for a period of two to three weeks. It would never be contemplated to perform major operations, except in an emergency, and the duties of the personnel would be to renew dressings and care for the ordinary everyday necessities of convalescent and convalescing patients. The difference between these types of ships seems, from this brief review, to be sufficiently clear, but a full description of the hospital ship and its duties will serve to emphasize these differences.

Before the present war began, the United States possessed but one hospital ship, the "*Solace*", which was a converted merchantman and had been in service as a hospital ship about nine years. Since war was declared, the Navy has added two more hospital ships to its fleet,

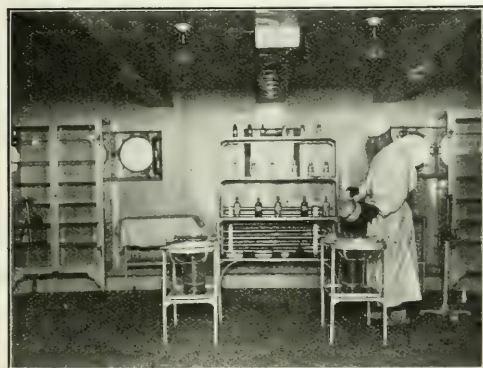
towards completion of this hospital ship have been necessarily delayed. In converting the *MERCY* into a hospital ship, the endeavor has been made to place the wards for the more seriously sick,—the operating rooms, laboratories, etc., on the upper decks where natural light and ventilation can be utilized to the full, and to locate below on the lower decks such wards and rooms as would accommodate the convalescing, the ambulance cases and the different departments which are not so dependent upon natural light and ventilation. We, therefore, find on the upper or promenade deck, from forward aft, first the operating suite, then the sick officers' ward and convalescent officers' rooms, and abaft these, the isolation wards for contagious diseases. On the deck just below, or hurricane deck, are placed the surgical ward immediately below the operating suite and connected to it by an elevator, the dental office, dressing room, diet kitchen, dispen-



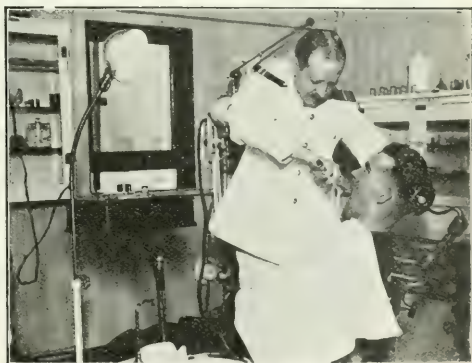
Commander Blackwood.



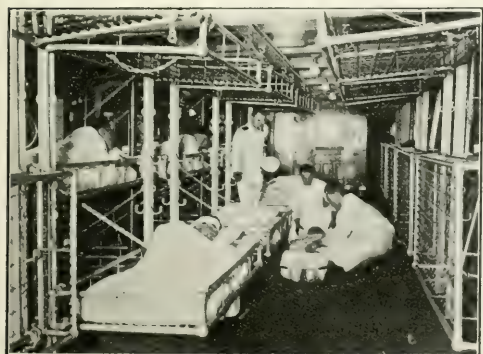
The Solarium.



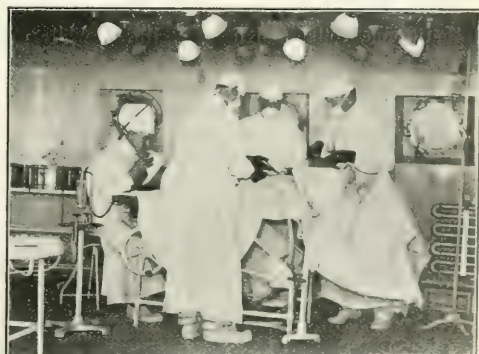
Corner of Operating Room.



The Dental Room.



The Surgical Ward.



Operating Room.

hand bowls with stand, running hot and cold water, soiled dressings container, and operator and anesthetizer's stools. This room is also tiled and painted with white enamel paint.

From the above description, it will be easily seen that four operating teams could work simultaneously, which means that the capacity for efficient surgical work is enormous and probably exceeds anything but the gravest emergency. In order to promote efficiency and cooperation, the head of the surgical department has also general supervision over the roentgenology, genito-urinary, and the eye, ear, nose and throat departments, while a close association is maintained with the medical department, thus giving all patients the benefit of the knowledge and abilities of the various specialists in these departments.

The ward for sick officers contains eight beds and six rooms, the former for the more serious cases requiring constant attention of the nurses, and the rooms for the less seriously ill and convalescent cases. This ward, like all the others, is fitted with every convenience that ingenuity and thoughtfulness could dictate. A large and comfortable mess room is provided for the convalescent officers, and a dumbwaiter connects this mess room with the neighborhood of the galley and special diet kitchen on the deck below. The linen room for the general distribution of linen on this deck is situated just abaft these quarters and in this room all of the repairing and distribution of the linen takes place. From this point to the after end of the ship are the contagious disease wards, five in number, with a total capacity of 42 bunks and the possibility of expansion to at least three or four times that number for temporary accommodation. These wards are operated separately and each one is provided with bathroom, toilet and other facilities, while one pantry serves for the distribution of food to the patients, without communication thru the wards, and contains a utensil sterilizer for disinfecting all of the mess gear after use. In the after end of this suite is a room for final scrub-up of all contagious cases, in which they receive their final bath and clean clothes before being discharged from quarantine.

On the after end of this deck is found an enclosed space in the nature of a solarium, which will be utilized for the overflow of contagious cases, and which, when no contagious cases are being housed, can be used for the recreation of convalescent patients from all of the other wards. This solarium will prove a most salutary adjunct

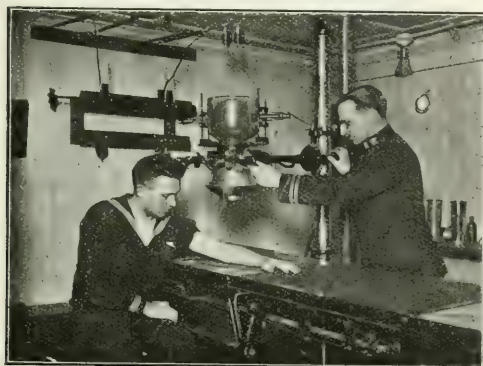
to the hospital treatment, as it will enable the patients to live practically in the open air and sunlight and at the same time be protected from all bad weather conditions.

Just abaft the surgical ward, on the starboard side, are the administration offices and the pay office, and next to them the office of the dental surgeon. This room is approximately 12 x 14 feet in size and is equipped with the standard dental outfit provided by the Navy and supplemented by additional instruments and apparatus specially chosen to most efficiently handle the character of cases that will come within the particular province of the Dentist in the Navy. Everything that can be thought of to meet the demands of the service has been provided in this room, and means are at hand for the treatment of oral infections, the surgical treatment of fractures of the maxillae and other operations which may properly come within the scope of the dental function. The office furniture is of white enameled pressed steel, and includes in addition to the regular equipment usually carried aboard ship, an excellent blow-pipe outfit for use in the absence of gas, a vacuum machine for casting purposes, a high frequency violet ray, an electric lathe and compressed air apparatus. With this equipment at his disposal the Dental Officer is enabled to perform most of the operations usually restricted to an office ashore.

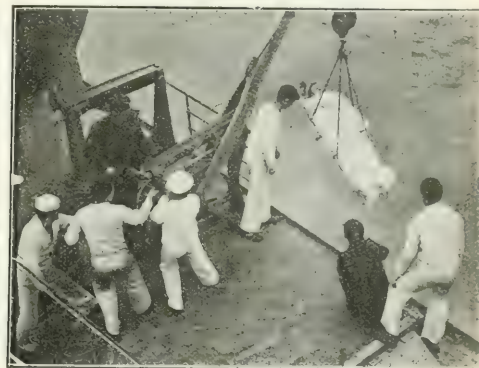
On the port side opposite the offices just described, and abaft the surgical dressing room, is, first, the diet kitchen, containing electric range, pasteurizing machine, steam cooker, coffee urns, and sink, and is capable of providing special diets for all the wards. Just abaft the diet kitchen is the x-ray room, and here we find recognized the importance of the x-ray in both general and military surgery and the equipment of this department has been made as complete and perfect as experience and careful selection could devise. The foundation of the installation is the current generator or transformer, which is of the most modern type and of greatest capacity of 12 kilowatts. This has been especially altered so as to adapt it to use aboard ship by the addition of a number of features not required under ordinary hospital conditions ashore. From this can be obtained an output of current far in excess of that required by even the most difficult and rapid radiography. The overhead control system of wiring, which conducts the high tension current to all necessary parts of the room, has been constructed with reference to the exigencies of space and arrangement, which installation aboard ship renders necessary, differing in important par-

ticulars from conditions ashore. The table is of the latest "tube built" type, enabling examinations to be made in either the standing or prone position and by means of either plates or the direct view with the fluoroscopic screen. On this table fractures may be reduced, bullets removed, or examination of pathological organs conducted directly by sight by means of the fluoroscopic screen, or a permanent record may be made on plates as required. The accessory apparatus, such as the special eye localizer for locating foreign bodies in the eye, for bullets or shell fragments, by new and rapid methods developed since the beginning of the war, is complete, and plenty of *x*-ray tubes of both the Coolidge and older gas type are provided against breakage due to ship conditions. Every

pathogenic bacteria; *Gastric analysis*, chemical and microscopical, and detection of common poisons; *Sputum examinations*, chemical and microscopical, with reference to detection of pathogenic bacteria and their isolation. Throat swab smear examinations and cultures; *Blood examinations*, including the determination of blood urea and blood sugar; complete microscopical examination for determination of blood cell changes or detection of blood parasites; blood cultures for detection of presence of pathogenic bacteria; *Serological examinations*; complete fixation reaction of lues; tuberculosis, and chronic Neisserian infections; agglutination reaction with special reference to determination of immunity; *Examinations of body fluids*, transudates and exudates; bacteriological and cytological



The X-Ray Laboratory.



Transferring a Patient.

provision has also been made for treatment by means of Roentgen therapy. On the deck below is situated the dark room for the development of plates, together with a special illuminating device for studying them. In but few base hospitals ashore is the *x*-ray equipment as complete or modern and up to the last minute as is found in this department.

Just abaft the *x*-ray room is found the laboratory, with good, natural light and ventilation, and equipment of the latest improved type, well adapted for all required chemical and pathological examinations. Following is a brief résumé of the work possible with our present equipment:

Urine examination, chemical and microscopical; complete chemical and microscopical examinations with bacteria determinations by inoculations or cultures; *Stool examinations*, chemical and microscopical; all ordinary tests with special reference to determination of intestinal parasites, amœbæ or

diagnosis; spinal fluid examination complete; *Determination of carriers*, typhoid, diphtheria meningitis and virulent pneumonia, micro-organisms with determination of type. *Preparation and standardization* of autogenous vaccines. Pathological diagnosis of tissues.

In connection with this laboratory is an extensive animal house situated on the boat deck and containing compartments for guinea pigs, rabbits, sheep and fowl, all of which are provided and cared for under the best conditions possible.

This brings us to the portion of the ship where the medical officers live, and just abaft this is the medical ward. This strictly medical ward contains 36 beds and is for the use of the active and purely medical bed patients. The light and ventilation are natural and supplemented by artificial light. Everything that is ordinarily found in the medical ward of a hospital is present here, including lavatory, toilet and bathroom facilities, portable

tub for hydro-therapeutic use, diet kitchen, and all its accessories. The accommodations of this ward can easily be expanded and it is flanked on either side by a good, wide, open deck on which convalescent patients may lounge in long chairs and get the benefit of open air and sunshine. Aft the medical ward is the autopsy room, this being so placed with regard to the patients as to remove all objectionable suggestion of possible unfortunate termination to those who are still in a precarious condition.

The eye, ear, nose and throat ward is situated forward on the main deck just below the surgical ward, and like all other wards is fitted with the necessary appurtenances for the proper care of the sick. The operating and examining room for this department is completely equipped in every respect and is much more fully supplied than the average specialist's office ashore. All minor operations, as well as special treatments, will be done in this office while under normal conditions; major surgical or minor operations requiring general anesthesia will be performed in the main operating room before described. However, the room is so fitted that, in an emergency, should the general operating room be not available, major operations could be performed in this room. In addition to a most complete supply of every description for eye, ear, nose and throat surgery, the following special appliances are included:

Sweet Eye Magnet, Wappler Caution controller, Marple-Loring Ophthalmoscope, De Zeng Retinoscope, McHardy Perimeter, Eldridge Color Test Lamp, De Zeng Oscope, Holmes Pharyngoscope, Mueller-Beck ether suction apparatus, and Sorenson Air Compressor; and the following not electric:

Gradle-Schiotz Tonometer, De Zeng Phorometer, and the usual trial case.

At the after end of this deck and immediately under the medical ward is situated the large genito-urinary and convalescent ward which contains 136 bunks arranged in two tiers and is capable of expansion to probably 200. In the after end of this ward is a separate room for venereal treatments. This room is furnished with an instrument cabinet containing all the necessary instruments for genito-urinary work, an electric instrument sterilizer, cystoscopic table, an immersion stand, a Valentine irrigator, instrument table, and stool. This room is complete in every detail and lacks nothing which is essential for diagnosing and treating venereal diseases. It is tiled and along one side of the wall is an irrigating urinal six feet long

There is also a lavatory with hot and cold water with foot pedal control.

This comprises the chief features of the hospital departments proper, but there are many accessories which are essential to the support of the hospital as well as the upkeep and care of the ship itself. Of all these accessories, there is none that can compare for usefulness and advancement in equipment of modern hospital ships with the "mechanical cow". This machine is one which has been but lately put on the market and bids fair to solve the problem of milk supply for the sick on hospital ships when at sea or removed from a base where good milk can be obtained. The milk produced by this machine is made from a combination of un-

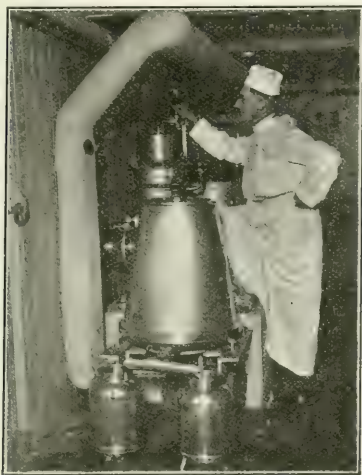


Guinea Pig Room.

salted butter and skimmed milk powder, and can be produced with any degree of butter fat required. Cream that will whip is also a product of this machine, and it all tastes like the very best dairy milk and cream that one can get anywhere, and really is so. By means of this machine, 15 gallons of cold, pasteurized milk can be produced in 45 minutes, and if more is required the operation is simply repeated, whereas if an excess amount is produced, it has only to be placed in the milk cans and put in the cold storage room where it will keep indefinitely just as fresh dairy milk will do. As an adjunct to this "mechanical cow", there is an ice cream machine for making ice cream in large quantities, run by electricity and controlled by one man. This machine will make ten gallons at a time, and is for use when large quan-

ties of ice cream are desired, but is supplemented by simple quart and pint freezers for individual diets for the sick.

The cold storage plant is large enough to carry fresh provisions for from three to six months, so that the hospital ship is absolutely independent of outside aid for that period at least. In connection with the cold storage plant is a refrigerating machine which will produce, under favorable circumstances, a ton of ice a day, besides furnishing the refrigeration for the cold storage, "mechanical cow", mortuary, and the refrigerating rooms where meats, eggs, milk and other fresh provisions are kept for daily issue up to the amount of one week's supply.



Mechanical Cow or Milk Separator.

The distilling plant, consisting of evaporators and distillers, is sufficient to furnish 35 gallons of fresh water a day per capita for 600 people, which will insure plenty of fresh water for the sick and crew for all necessary purposes. Two large disinfectors of the American Sterilizer type are built in at the after end of the contagious wards and are capable of disinfecting large numbers of mattresses, bedding, and even furniture, which may come from the contagious wards.

There is a mortuary where bodies may be stored in cold storage after having been properly embalmed and placed in metal caskets. This department is presided over by a registered undertaker and embalmer, and it is hoped, is far too large to ever be filled, though it has been constructed with

a view to the excessive number of dead under war conditions.

The galley or kitchen and commissary department is under the direct management and control of the Paymaster of the ship and is fully capable of providing foods of any kind, but the special diets, for at least 600 people, containing as it does, all the modern appliances of ranges, steam cookers, electric ovens, coffee urns and bakery, of modern and most approved type.

In the after end of the ship, on the main deck, is situated the laundry, which is equipped with all the best and most modern type of electric laundry machinery, including washers, tumblers, extractors, pressers, mangles, ironers, shapers, dry room, and



Ophthalmology Room, Showing Large Magnet.

all the accessories found in the well-known steam and electric laundries throughout the country.

There are, besides the accessories already mentioned, probably many things that do not occur to the writer as being worthy of note, because they are the things with which we seafaring people are brought up and constantly associated, all of which have their peculiar place in the general upkeep of the ship and its hospital departments. These departments are to be found very generally in all large hospitals, but, of course, on board ship where we are dependent upon ourselves for most of our repair work and minor new construction, they are of much greater proportions than would be necessary ashore. These consist of carpenter shop, machine shop, electric shop, storerooms for dry

provisions, medical and surgical supplies and dozens of other things which readily occur to all those familiar with requirements of hospitals.

Before closing this description, we must look into the subject of the less material side of the care of our patients and see what has been provided for the amusement and recreation of the sick and convalescents, and here we find equal thought has been given and as far as we are able to judge, all of the necessary means of amusement have been provided. There is a moving picture machine and a pianola, the former presented to the ship by a generous contribution from the National Society of the Colonial Dames of America. The films for the "movies", when the ship is anywhere in United States' waters, are provided by the ever present and most useful and generous Y. M. C. A., while the generous supply of records for the pianola came from the welfare and athletic funds of the Fleet. There are a number of victrolas which were presented through the American Red Cross by the generous contributions from thoughtful people in New York, interested in the happiness and pleasures of the sick.

The government has supplied a good fiction library, the books of which are at the disposal of the men, and this library has been supplemented by contributions from various organizations, so that it is ample for the number of people that the ship can carry, though, of course, additions of the latest books will at all times be gratefully received and the books replaced by others as they wear out in use. Some of the larger daily newspapers of New York have already very thoughtfully contributed copies of their daily issues, and associations of war time clubs have signified their intention of subscribing to some of the more popular of the weekly and monthly periodicals. A liberal supply of games for the amusement of those who are confined to their bunks, and are not able to get about the ship, has been furnished by patriotic persons, principally in New York, and more of these will undoubtedly be contributed from time to time as the attention of these persons and societies is drawn to the benefits which may be derived from them, and the opportunities afforded them to contribute for the diversion and healthful exercise of the patients and of the large body of male nurses, members of the hospital corps and crew who attend upon them. Provisions have been made for all of the American athletic games, such as baseball, swimming, boxing, etc., and all hands are encouraged in perfecting themselves in rowing, sailing and swimming.

The spiritual welfare of all hands is looked after

by the Chaplain, who, in addition to the religious duties which belong to his profession ashore, has charge of all the amusements and entertainments, and by every possible means tries to provide those healthful and health-giving pleasures which will lead the men into moral ways, and strengthen their steps, which at this time particularly are beset by all manner of pitfalls.

From the above description it will be seen how complete and various and diverse are the provisions of the ship for the care of the sick and the preparation for meeting emergencies, and it is believed that the friends and relatives of those in the service, who are fighting the great fight, will feel more comfortable about their dear ones, should anything happen to them, when they know of the great amount of thought and labor that has been put into the preparation of this hospital ship, where such men will be cared for in time of illness and accident.

This story might be continued at great length and much more might be told of the methods of handling the sick and wounded, the regulations governing even the most minute details of their treatment and care, and the thousand and one things that are necessary for the handling of the ship itself and the various departments under it, all of which are presided over, and the responsibility for the efficiency of which, rests on the shoulders of the Commanding Officer, who, as will be remembered, is a medical officer. But such description would make the account too long and would simply weary the reader. As time goes on and facilities increase, it is hoped that the government will be supplied with a number of ships of this character, so that the men of the naval service will be even better and more carefully looked after, than it has been possible to do in times past.

THE BABY AND THE DRAFT

What has the baby to do with the draft? It is the draft which has pushed the baby to the foreground of attention. Between forty and fifty per cent. of all drafted men are being rejected because of physical defects—more than two-thirds of which are preventable. These facts are causing grave concern throughout the country—they are an indictment of our civilization, of our protection of motherhood and babyhood; they are of grave portent for the future. They make the safeguarding of the baby no longer merely a matter of "humanity," of "charity," of "uplift," but of supreme and national necessity.—*The Social Hygiene Bulletin.*

THE PREVENTION AND TREATMENT OF
SURGICAL SHOCK.

JOSEPH F. FOX, M.D., F.A.C.S.

TOLEDO, O.

Considering the large amount that has been written within the past twenty years relative to shock, its pathology, classification and treatment, it is with extreme hesitation that the writer undertakes to attempt to add anything more to the subject.

Different opinions are expressed as to whether the pathology is due to inhibition, exhaustion or paralysis. A difference has also been recorded between shock resulting from accident or surgical trauma and that caused principally by hemorrhage. It appears to me that there is very little difference, if any, between shock that may be produced by a railroad wreck or a long and difficult surgical procedure. In both instances there would be more or less trauma and some loss of blood; in the one there would be an addition of some depressing effect due to the anesthesia, or from a condition of shock which is caused mainly by a loss of blood, as in a case of placenta previa or a ruptured tubal pregnancy.

Another reason for hesitation in writing on this subject is that all the writer has to offer is almost at indirect variance with the principal teaching at the present time.

In order that we may reach a starting point, in briefly reviewing the work done along a certain line, let it be understood and agreed that the term shock, as it will be used by me is to apply to and mean any condition of shock, produced by whatever cause possible.

Early in my surgical career it became a fixed custom to study very carefully the therapeutic effects of all drugs administered in connection with surgical cases. It was soon discovered that after a dose of strychnin was administered, the patient would breathe better and the pulse would be stronger; this condition would last from one-half to one hour. Later, when another dose was given, this condition of improvement was again present and would be even better and last longer. The problem that now presented itself for solution was, how frequently could strychnin be repeated with safety? I decided to disregard the therapeutic dose and effect, and to watch for the physiologic effect of the drug.

Strychnin therefore was administered more frequently in all cases of shock. By increasing experience it was noticed that strychnin seemed to have a far better effect in the treatment of shock than any of the remedies usually recommended; under its use

the pulse became stronger and less frequent; the moist and perspiring skin became dry and warm; a restless, sighing patient became quiet with respirations regular and deeper.

The drug was carefully studied and was administered in larger doses, while constantly on the alert to detect the slightest manifestation of a physiological effect. The textbook dose, in numerous instances, was far overstepped, with no poisonous or ill effect; on the contrary, the patients made a rapid convalescence, and the day following a severe operation seemed to be almost in a normal state, so far as their circulation and general condition were concerned.

The large doses of strychnin that were finally reached in this series of tests, without ill effects, convinced me that in shock there is a tolerance or rather an indication for strychnin and that the size of the normal or effective dose can only be based upon the degree of shock in each individual case.

Much experimental work has been done in the physiological laboratory in testing out remedies in the treatment of shock. It is a well recognized fact that certain drugs act differently on animals than they do on the man. The dog, for instance, is easily thrown into convulsions by strychnin, but will take an abnormally large dose of opium or morphine, with no more inconvenience or injury than being put into a sound sleep for a few hours. The pigeon can be fed exceedingly large doses of strychnin with impunity.

Dr. S. O. L. Potter, writing in Foster's "*Practical Therapeutics*," makes the statement that strychnin acts in different degrees on animals than it does on man; birds and guinea pigs were comparatively insusceptible to it. M. Ricket, quoted by Blyth in his work on "*Poisons*," reports results from a series of experiments in which even a comparatively small dose of strychnin, injected beneath the skin or into a vein of the dog, would in a few seconds bring on tetanic convulsions, and the attack would prove fatal if the dog were allowed to be quiet; if artificial respiration is employed promptly, the convulsions disappear, and the heart assumes its regular rhythm.

One would hardly be justified in condemning a remedy as being unworthy of a trial, and even as injurious in the treatment of a specific condition in man, merely because it fails to act satisfactorily in an experimental test on one of the lower animals.

Dr. Eisendrath, in his second edition of *Surgical Diagnosis*, has this to say in the diagnosis of shock: "The chief symptoms of postoperative shock are the same as those of shock following injury. These are (a) marked pallor and coldness of the skin and visible mucous membranes, accompanied by a slight

tinge of cyanosis; (b) a small, irregular and rapid pulse; (c) a stuporous or apathetic appearance of the patient."

If a patient has just undergone a serious or prolonged surgical operation, or has been the victim of a severe accident, and has a weak and rapid pulse, together with a pale countenance, a cold and perspiring skin, with a mental and physical weakness, he is obviously in a condition of shock.

For practical purposes the condition of the pulse and the skin furnish a very accurate idea as to the degree of shock present, providing these conditions are taken into careful and intelligent consideration. They may vary from a pulse which is moderately weak and frequent, with a skin cold but dry, to a pulse so weak and frequent that it cannot be counted at the wrist and the skin dripping wet with a cold perspiration. Of course, an apparatus to measure the blood pressure would furnish accurate information as to the amount of shock in each instance.

Much of operative work until the last few years was under chloroform anesthesia. When the patient did not take the chloroform well, when the heart was depressed or the breathing in particular was bad, a moderate sized dose of strychnin, as 1/30 gr., was administered, as soon as the disturbance was detected, with the most satisfactory effects. I refer more particularly to mild surgical cases, or to the severe cases before the operation was commenced, when no shock was present, save the depressing effect of the chloroform; under the above treatment shock was entirely prevented. In the large number of chloroform anesthetics, aided by this precaution, that have been administered for me, I have not observed any injurious effects directly traceable to the anesthetic.

It was this very agreeable effect of strychnin when administered early in the course of an operation that first led me to use it to antagonize or prevent shock. A large series of cases have been treated in this manner and the results recorded. The amount of strychnin administered depended entirely upon the condition of the patient and also the severity of the surgical work required. Some received a small dose and others one that was much larger; but in all instances it was administered early, that is to say, usually about the time operation was commenced. In some cases, if the patient manifested any unfavorable symptoms before anesthesia was complete, it would be administered at once. The effect was very noticeable and most agreeable; breathing was better, pulse stronger, cyanosis less; in short, the operation and convalescence seemed much smoother and more satisfactory. Strychnin

should not be administered to a patient free from shock, prior to the commencing of the anesthetic, even if the case is to undergo a severe surgical operation; if shock is present from trauma or hemorrhage, then it should be administered at once.

After a time when this method was more fully worked out, it became a custom in the operating room to watch most carefully for the cardinal symptoms of shock. At the slightest indication of a rising pulse with a cool, moist skin, a hypodermic injection of strychnin was promptly administered; this dose would be repeated in ten or fifteen minutes if the patient's condition was not improving in a satisfactory manner.

It might be stated in this connection that a hypodermic injection is taken into the circulation much more rapidly than is supposed, even in cases where the patient is in considerable shock and apparently has a poor circulation. In experiments made by M. Richet—quoted by Blyth—a solution of strychnin injected subcutaneously acted in fourteen seconds. The writer has frequently observed very decided effects of strychnin, injected by the needle into patients suffering from severe shock, within three to five minutes. The injections were usually made somewhere over the chest or shoulder upon the supposition that they would be taken up more readily.

A marked contrast would be noticed, if one were to compare the hospital records for the first twenty-four to forty-eight hours, of a series of operated cases where strychnin was used intelligently, as indicated, with the aim of preventing shock, with a series of similar operative procedure where every other method recommended to relieve shock had been employed without, however, giving any strychnin. The record of the one series would show a full and strong pulse many times near the normal mark, with a dry and warm skin, showing that reaction had fully set in; the other would show a weak pulse ranging from 110 to 120 or even 130, with frequently a record that the patient had been restless and perspiring.

After years of study and investigation along the line of the prevention and treatment of shock, it occurred to me that there was more to be done than merely raising the blood pressure. After all, the low blood pressure appears to be merely a symptom of shock, as is the small and rapid pulse, the cold and perspiring skin, the great muscular weakness, the mental apathy and, at times, a low delirium.

In shock, something has gone wrong with the nervous mechanism of the system; let this something be what it may—a temporary inhibition or a partial suspension of certain cord centers. It is my

firm belief that in strychnin we have a safe and certain remedy for the relief and cure of this condition. Under its proper administration the weak and frequent pulse becomes stronger and slower. The cold and perspiring skin finally becomes dry and warm. The muscular strength again returns to the patient. The brain becomes clear and its function is once more restored. Strychnin does more than raise the blood pressure; it restores all the other damaged functions as well. The injury of the nervous system is relieved or removed, and gradually these embarrassed functions become normal.

Frequently within a few hours' time a patient may be transformed from a nervous and physical wreck into a rational and thinking being. This cannot be accomplished with a single dose of strychnin, which at times needs to be administered with a free hand. When good results are often observed after a dose of strychnin, one should not wait until the effects are entirely lost, but should be repeated sufficiently frequent, that the effects of repeated doses support each other, stimulating the patient. A good strong pulse and a perfectly rational brain furnish proof positive that the patient is free from shock and that treatment may be discontinued.

In an attempt to prevent shock, the strychnin should be administered soon after the operation is commenced and repeated, if necessary, at the first indication of approaching shock. It should never be administered prior to the administration of the anesthetic. The size and frequency of the dose, in either the treatment or prevention of shock, depends entirely upon the condition of each individual patient.

Differentiation between shock and collapse, two terms frequently used by some writers on this subject, seems rather difficult in some instances. Dr. Mumford in his work, "*Practice of Surgery*," states concerning the two terms: "In truth, one cannot but feel that such a distinction is artificial, and that, as the words are commonly employed, shock is a state of extreme collapse, or vice versa, if you please."

This treatment of shock with strychnin was employed over two thousand times in various surgical operations; hemorrhages, or accidental traumata, without any abnormal effects of the drug in any case. Not even an idiosyncrasy against the drug was observed.

The method employed was to administer it hypodermically repeatedly until all signs of shock were gone. It has been my constant habit to instruct and train the nurse to watch most carefully and study the conditions of the pulse and skin. Any rise in frequency or weakness in quality of the pulse, together with a commencing coldness or sweating of

the skin, means the approaching of more shock, and calls for strychnin, unless the condition can be clearly explained in some other manner. A strong pulse and a dry, warm skin are the only positive indications that the patient is in a good condition. There was not a single case of the so-called delayed shock in my entire series.

In only a very few cases was the physiological effect of strychnin noticed. When shock was severe before the treatment was commenced, as occurs for example with a ruptured tubal pregnancy or a severe injury, the good effect was very slow to manifest itself. Such conditions are indications for the large and frequent dose. Morphine may be added for the pain prior to the operation. Only after frequently repeated doses were administered could any improvement be noticed; when, however, the physiological dose was being approached the improvement of the patient's condition came rapidly, and came to remain. This sudden change as it might be termed, from a patient in profound shock into an opposite condition, was so marked that one could not fail to notice the apparent similarity in action of morphine to pain, that strychnin bears to shock. It is a well known fact that a moderate sized dose of morphine will give no relief in a case where the pain is terrific. The dosage of morphine must, in a measure, correspond to the degree of pain present. The relation strychnin bears to shock is practically identical to the relation morphine bears to pain in my estimation.

It is truly remarkable what a large dose of strychnin is tolerated by a patient suffering from severe shock without manifesting any physiological effects. The largest dose administered by the writer at one dose was $\frac{1}{5}$ of a grain. It is seldom, however, that such large doses are required. It is preferable to use it in doses of $\frac{1}{15}$ to $\frac{1}{30}$ gr. and repeat in fifteen minutes to one-half hour for several doses, if it is necessary. Later on it need not be repeated oftener than at one to two hours' intervals if needed and should be given in smaller doses. It is a safe prediction, that if several doses of strychnin have been administered close together, and the physiological effect has not appeared within fifteen minutes from the last injection, it will not appear, and another dose can be administered with safety.

In this connection it may be stated, if mild physiological effects of the drug should be manifested by light muscular twitchings of the extremities, which occur every two to three minutes, usually nothing need be done, except to watch the patient closely; in one-half hour's time they usually will have disappeared.

The most marked physiological effects noted oc-

erred in a woman with a ruptured tubal pregnancy. The patient was regarded as dying. One-eighth gr. of strychnin was administered promptly and she was operated upon as quickly as possible. In all she received 1/2 gr. of strychnin hypodermically within a period of about five hours. Two hours after the operation moderate strychnin convulsions developed and occurred every three to five minutes. Ten grains of Choral Hydrate and Bromide of Soda, given by rectum, soon controlled the convulsions and patient made a splendid recovery.

Hypodermoclysis of saline solution is a great aid in the treatment of shock where there is a great loss of blood, to aid in restoring the normal volume of fluid in the circulatory system.

During recent years expert operators see much less shock manifested. It has been my habit, in nearly all cases, to administer 1/30 gr. strychnin when the patient is nearly under the anesthetic. The reaction is much better while undergoing the operation, the small danger due to the administration of an anesthetic is greatly decreased or removed.

In conclusion, since the surgical profession is so much divided as to the merits of strychnin in the treatment of shock, I would respectfully ask the surgeons to try this treatment thoroughly in their practice. In an ordinary laparotomy, when the patient has been considerably reduced in her health and strength, if 1/30 gr. of strychnin is given at the beginning of the operation and repeated near its close, the rapid convalescence of the patient is insured. Let it be settled, if possible, for all time, whether this drug is of any value in the treatment of shock. The mistake in the past has been that in the severe cases of shock an insufficient amount of strychnin has been administered to meet the indication. The work of Alonzo Clark should be remembered, when he taught the medical world that heroic doses of morphine were necessary to meet the demands of a severe general peritonitis. For such condition the therapeutic dose of morphine is useless; one must establish the physiological dose. In a severe case of shock the conditions are similar; strychnin must be administered until the physiological dose attains the desired effect or some contra-indication arises.

WASSERMANN RELIABILITY.

1. Depending on the antigen employed, the Wassermann reaction in the living patient, as carried out at Bellevue Hospital, gives a negative result in from 31 to 56 per cent. of cases.

2. The Wassermann reaction in the living patient is positive in at least 30 per cent. of cases in which it is not possible to demonstrate any of the anatomic lesions of syphilis at necropsy.—D. SYMME, M. D., *The Journal of the American Medical Association*.

MORULAR OVARIAN NEOPLASMS; THE SO-CALLED OVARIAN DERMOID CYSTS; A BRIEF LITERARY REVIEW, INCLUDING THE REPORT OF A CASE.

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(Continued from May issue.)

White reports the case of a post-peritoneal morular tumor accompanying appendicitis in a boy four years old. A "lump" had been discovered in the right abdominal quadrant five weeks previously. The cyst contained putty-like material mixed with hair and pus: a rudimentary premaxillary bone with four fairly well-formed incisor teeth and an upper lip; also a piece of amorphous bone the size of a chestnut "The origin of this cyst is interesting as it is hard to explain, there being no viscus in this part of the body originating from the epiblast." (White.)

In a case recorded by Harris, the patient was a girl five years and ten months old. Development of the ovarian tumor was associated with the beginning of puberty at five years with rapid bodily growth. The tumor was a complex cysto-solid teratoma with definite adeno-carcinomatous areas. No menstruation since removal of the tumor and no further precocious growth. The first menstrual period appeared when the patient was five years old; the second began two months later and was followed at regular intervals of four weeks by five other periods; each lasted one week and was accompanied by profuse discharge and pain the lower abdomen. The physical changes usually observed at puberty were noted soon after the first menstrual period. The breasts grew larger, the areolæ darkened, and the whole body developed rapidly. Growth of the tumor was well advanced by the third menstrual period, seven months before operation, when its presence was discovered by the family physician. There was no discoverable recurrence thirty months after the operation.

A somewhat similar example is reported by Cattermole in a girl of five who developed sudden pain in the right abdomen and groin. Physical findings: rigidity of right rectus and temperature of 99° F. Several enemata induced relief, and the temperature fell to normal. The next day an ovoid tumor was discovered in the midline. The temperature was then 99.6° F., pulse 100. An enema was followed by expulsion of

gas and feces and vomiting of bile. That afternoon the temperature rose to 100.6° F., pulse 110; urine s. g. 1012; no albumen. Diagnosis: abdominal tumor causing partial fecal obstruction. Celiotomy disclosed considerable dark fluid in peritoneal cavity; orange-sized tumor easily delivered; it was dark red in color and attached by pedicle to right ovary. The pedicle was twice twisted. Tumor contents bone, hair and several cysts, the latter containing bloody serum.

O'Shansky states that two months after an attack of typhoid fever a female of twenty-one noted an abdominal tumor, and was operated upon one month thereafter. A large right ovarian cyst was aspirated and two quarts of thin pus evacuated; a few strands of hair were attached to the canula on removal. The pedicle was ligated and the tumor removed. On bacteriological examination a smear showed a gram-negative bacillus. The growth showed a gram-negative bacillus in pure culture which did not produce gas in sugar media, did not liquify gelatin, and did not coagulate milk. Pathological examination after fixation revealed a growth 15x15x11 cm. in its largest diameters. When the cyst was opened a quantity of grayish liquid containing fat-like substance such as commonly found in "dermoid" cysts was noted, and masses of this fatty material containing hair were removed. At one portion where the wall was thickest there was a tuft of hair growing therefrom; at another there was a short nipple-like projection somewhat calcified.

Cleland mentions a "dermoid" cyst with a small imbedded mass having the naked eye appearance of thyroid tissue, which microscopically showed typical characteristics of that gland. In another case the cyst contained fatty material, hair, sebaceous glands, two perfect incisors, a bicuspid, and two masses irregularly placed probably representing unerupted molars. Through a mass of cancellous bone and muscular tissue a laterally compressed smooth-lined cavity extended backward divided by a partition (nasal cavities?). From the outer wall on one side projected mesially a rounded fold (turbanated bone?). Above was a fatty mass with a broad strand of nervous tissue loosely adherent to underlying structures, to which was attached a small cyst containing light yellow fluid not reducing Fehlinx's solution but slightly altering its color. Sections of the nervous tissues showed a granular matrix with fairly numerous small

(neuroglia?) cells and vessels; there were also a few large (cortical?) cells and concentric bodies (corpora amylacea?). In one area was a large mass of melanin granules surrounded by fibrous tissue.

Vaccari collected from the literature of the world one hundred and thirty-two examples of bilateral "dermoid" cysts from 1875 to 1910, and estimated that both ovaries were involved in fourteen per cent of all cases. In the majority of instances there was a history of leucorrhea, dysmenorrhea, metrorrhagia and menstrual irregularities, especially as to the duration and quantity of the discharge. In eighty per cent the cysts were markedly unequal in size. The symptoms were attributable to: (a) compression, (b) adhesions, (c) ascites (rare), (d) torsion of the pedicle (fourteen per cent), (e) suppuration, and (f) carcinomatous degeneration. In the greater proportion of cases the ante-operative diagnosis was "cystic ovaries, bilateral salpingitis, or multiple uterine fibroids." Two cases are mentioned in which the x-ray revealed the nature of the cysts. Vaccari concludes:

(1) The occurrence of bilateral ovarian "dermoid" cysts is not rare.

(2) Such cysts cause relatively few menstrual disturbances; there is rarely premature amenorrhea or typical metrorrhagia after the menopause.

(3) Sterility is infrequent and conception may take place.

(4) Complications which are common to cysts in general, such as twisting of pedicle, adhesions, suppurations, etc., as well as painful symptoms, are more marked in bilateral than in single cysts.

(5) Even in double "dermoid" cysts, ascites is rare.

(6) The diagnosis of bilaterality although difficult is not impossible; "dermoid" cysts may simulate salpingitis, ovario-salpingitis, or multiple uterine fibroids.

(7) The finding throughout the abdominal cavity of "dermoid" cysts of various sizes, and having the type and shape of metastases, suggests that "dermoids" may not be benign tumors.

(8) Carcinomatous degeneration is rare in bilateral cysts and very exceptionally involves both tumors.

(9) In every operation for "dermoid" cyst of one ovary, the opposite ovary should be examined before closing the abdomen.

Quiet recently Barkley and Herring reported

a bilateral case where the large right cyst occupied almost the entire abdominal cavity, crowding left cyst and viscera into small space. Patient aged twenty-six, married at sixteen, one living child aged nine, miscarriage at seven months eight years ago, no pregnancy since. Menstruation began at eleven, duration two days, scanty, painless. Two months amenorrhea three years ago followed by abdominal enlargement and edema of feet; later menstruated ten days, headache and abdominal pain. Few days thereafter vaginal extrusion several "pieces of flesh" with foul discharge. Next period normal, then amenorrhea two months; pelvic tumor noted about that time. Prolonged illness first was diagnosed as malaria, later as typhoid fever; menstruation at first continuous, then ceased for year. Celiotomy: right cyst contained one and half gallons milky white thick fluid, large tuft brown hair and five or six teeth. Left cyst size of egg filled with hair and teeth. Microscope showed connective tissue surrounded by layer of cells, mostly mononuclear, other sections with hyaline change, few pigmented cells and embryonic muscle fibers; hair, sebaceous glands, squamous epithelium and voluntary muscle with brown atrophy, osseous tissue, etc.

A similar case is recorded by Holmes in a woman of twenty-seven, married ten months. Miscarriage three months after marriage; she stated "the doctor had great difficulty in removing the products of conception." Appendicectomy shortly before marriage when she was told normal left adnexa was palpated. Following a fall three years ago pain in right inguinal region between menstrual periods. Since marriage increased pain and backache. Large right pelvic tumor pushed uterus to left; smaller tumor left side. Right tumor presented appearance of large multilocular ovarian cyst which proved to be "dermoid;" no adhesions. Left tumor showed small area apparently normal ovarian structure and resection was attempted. Cyst wall so thin and friable a few drops of the semi-fluid contents contaminated abdominal incision, and left ovary was then completely removed. Sixth day fetid pus escaped; colon bacillus infection. "That one of the tumors should have been a multilocular dermoid is unusual in my experience." (Holmes.)

Doyle cites the case of a primipara upon whom he operated for ovarian tumor with twisted pedicle and acute appendicitis, complicated by pregnancy. History of abdominal pain since age of nine. Menstruation began at sixteen,

eighteen-day type, three days' duration, severe premenstrual and comenstrual pain. Acute appendicitis at fifth month of utero-gestation; examination unsatisfactory because of intense pain. Celiotomy: ovarian tumor with two twists in pedicle; acutely inflamed appendix adherent posteriorly. Tumor four inches in diameter contained sebaceous material, six teeth and some hair; numerous hemorrhagic areas. Pregnancy uninterrupted, patient giving birth to normal living child at term.

Perhaps the most curious of the morular ovarian neoplasms is represented by the so-called "moth ball" type. Ward mentions the successful removal of such a cyst weighing thirty pounds from a woman of thirty-two, the mother of two children aged ten and twelve. The tumor was first noted several years previously. "The unusual feature in this case was the nature of the contents of the sac. There was a large quantity of long, straight hair growing from the cyst wall and an equal amount of loose hair in short pieces floating through the tumor contents, a portion of which formed nuclei for what were called 'moth balls' of which there were about one and a half gallons. These balls or marbles varied from the size of moth balls, as manufactured and sold by druggists, to that of small walnuts. They seemed to be composed of sebaceous matter, and were evidently formed around the short hairs by the motion of the fluid produced by walking or riding. There was some tissue resembling true skin attached to the inner wall of the sac." (Ward.)

According to McMeans the study of "dermoid" cysts and their contents is interesting and rather perplexing;—perplexing in that the nature of the material within the cyst is at times very different and may be found aggregated into small ball-like masses, each ball being separate and not tending to adhere to its fellows. The occurrence of these individual balls has been difficult of explanation, and at present there is little definite information on the subject. A case reported by this author is so interesting that it is abstracted somewhat at length:

The patient was a female of forty-nine and dated her ill health from four years after miscarriage which occurred thirty years previously, at which time her uterus was curetted. She suffered repeated attacks of severe pain in right flank radiating upward to the chest. Pain and asthmatic manifestations gradually increased. Last menstruation exceedingly profuse; no leu-

corrhea; general "bearing down" pains and backache with frequent desire to urinate. Celiotomy: removal of right ovarian cystoma the pedicle of which showed torsion.

Pathologic description: specimen consisted of ovarian mass 20 cm. in diameter. Walls externally smooth, but on palpation gave sensation of irregular thickened areas. Color of serosa milky white with dark areas of congestion. Surface of cyst showed many large vessels radiating from base. Through cyst wall number of small spherical bodies could be felt. When opened cyst found to contain innumerable putty-like concretions, ranging in size from a pea to a marble, and several larger masses of same consistency in which were incorporated many dark brown hairs. Surface of smaller masses smooth and uniform yellowish gray color. Many concretions showed flat surfaces or facets, due to close apposition to others, as they completely filled the cyst. There was no free fluid. On section cut surface of balls had homogeneous greasy appearance with a central irregular cleft containing clear brown oily fluid. Larger masses did not show this central structure, but had a central core in which many hairs were matted together. Lining of cyst wall smooth; thickened, pale, pearly areas; some dark slate color. Cut surfaces of these areas had homogeneous cartilaginous appearance.

Sections of the concretions showed no definite structure nor enveloping membrane. The matrix consisted of granular amorphous material in which the "ghosts" of cells could be seen along with irregular, short, thread-like structures, looking not unlike fine hairs.

A comparative examination of the lipid material in ordinary "dermoids" and of the concretions showed the following:

ORDINARY DERMOID.

1. Material semi-fluid at 37c.
2. Much hair intermixed.
3. Small granular fat particles.
4. Small amount of debris.
5. Squames, few.
6. Cholesterin (chemically).
7. Double refractive bodies present in great numbers.
8. No inflammatory cells.

DERMOID CONCRETIONS.

1. Concretions semi-solid.
2. Few hairs in concretions.
3. Large fat drops.
4. Much debris of cells.
5. Squames, many.
6. Cholesterin (chemically).
7. Double refractive bodies present.
8. Inflammatory cells.

Lapouge reports three cases of carcinoma in ovarian "dermoid" cysts, and summarizes forty others from the literature. The presence of the

tumor was known for many years in several of the cases before malignant transformation supervened,—twenty-six years in one instance. He states that when carcinoma develops the course is rapid, death following within six months at the longest. "The malignant transformation had progressed so far in the cases on record before operative treatment was applied that no instance of complete recovery is known. Intervention merely prolonged life a few weeks or months, excepting in one of Tedenat's three cases, in which the patient survived for seven years." Although operative treatment is usually instituted before malignant changes have occurred, the author says "even allowing for this there are over sixty cases on record of cancer in a dermoid cyst of the ovary."

There has been much discussion concerning the infectious nature of the contents of morular ovarian neoplasms, and convincing arguments have been presented upon both side of the question. Nearly every text-book contains the statement that great care should be exercised in removing such tumors to prevent the escape of their contents into the abdominal cavity. According to Senn, rupture of a "dermoid" cyst is oftentimes the cause of fatal peritonitis; in a few instances this accident has been followed by multiple secondary tumors on the peritoneum having a tuft of lanugo-like hair; they are usually about the size of a cherry and occur in clusters or imbedded in adhesions. "In the removal of ovarian dermoids the trocar must be used with caution, as the escape of the contents of the cyst may cause septic peritonitis or dissemination of the tumor by epithelial infection." (Senn.) On the contrary, however, it is claimed by other authors that "the material of a dermoid cannot be considered other than bland. It is nothing but epithelial cells, a little hair, etc., and why that should lead to inflammatory reaction is not readily seen." Ries states "from what we know of rupture of dermoid cysts spontaneously or accidentally without operation, we could not assume that the contents of the cyst led to supuration of the tissues." Many cases of this character have been operated upon where rupture had occurred and there were particles of "grumous stuff and hair" surrounded or encapsulated by omentum without further intra-abdominal disturbance. "In attempting to conserve a portion of the ovary it not infrequently happens that there is escape of dermoid tissue into the cavity without infection."

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RESULTS OBTAINED IN SEVENTEEN CASES OF HOURGLASS STOMACH BY OPERATION.*

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The observations set forth in this paper are based upon the operative results obtained with seventeen patients having an hourglass contraction of the stomach following benign ulcer. I realize fully that this number is far too small to justify positive statements, but the fact that fifteen of them have been observed for an average period of two and one-half years after operation, and one for more than nine years, at least permits an opinion as to the comparative value of the various operative procedures employed. There were sixteen females and one male in the series. The average age was thirty-nine years. There was one operative death—the seventeenth patient dying from pneumonia—on the sixth day after medio-gastric resection.

Before the Roentgen-ray came into general use as an aid to the diagnosis of stomach lesions, hourglass contraction was considered to be somewhat of

a novelty and was usually discovered after the abdomen had been opened. The various means at our disposal prior to the advent of the bismuth meal, such as distending the pouches with gases, lavage, etc., occasionally suggested such a deformity of the stomach, but a positive diagnosis could rarely be made. Well taken radiograms not only established the diagnosis at once, but gave a fairly accurate idea as to the relative size and shape of the pouches, the width of the channel connecting them, and the condition of the pylorus. This information gained beforehand is of great assistance to the surgeon in determining the best suited operative procedure.

The one absolute requirement of any operation employed in the treatment of hourglass contraction is that the symptoms due to obstruction be relieved. If at the same time the procedure adopted can include excision of the ulcer or the cicatrix of a healed ulcer, without too great a risk, so much the better; but it must be remembered that the great majority of these patients come to us on account of weakness due to inability to take or retain sufficient food. Pain has become an old story with them, and in many instances causes little alarm until vomiting and loss of weight appear. A severe hemorrhage was the immediate cause of one of our patients coming to the hospital. This was the only instance in which there was bleeding of any consequence.

At least four operative procedures—gastroenterostomy, gastroplasty, gastrogastrostomy and medio-gastric resection or resection in continuity—are available in the treatment of hourglass contraction. To these pylorotomy should be added as the method to be adopted if the constriction is near the pylorus, thus forming a small distal pouch. We have had no case of simple stricture in which the latter operation seemed to be indicated, and for this reason are not in a position to discuss its merits.

Gastroenterostomy is the operation most generally used for the relief of this condition. This procedure alone was employed six times, and once was combined with gastroplasty. It is hardly necessary to state that as a rule the intestine should be anastomosed to the cardiac pouch. As an exception I can cite an instance when the constriction occupied the middle third of the stomach, and was caused to a large extent by perigastric adhesions. There was marked infiltration of the walls of both pouches, proved subsequently to be syphilitic, with a large retention in the lower pouch and no retention in the upper. After the channel connecting

* Read before the New York and New England Association of Physicians and Surgeons, November 5th, 1917.

the pouches had been sufficiently freed to admit three fingers the gastroenterostomy was made to the pyloric pouch. The after-history of this patient is interesting in that she died one and one-half years later of a generalized syphilis—all symptoms referable to the stomach had been entirely relieved.

Failure to note stenosis at the pylorus once necessitated a second operation to relieve stasis in the pyloric pouch. With this exception the results following gastroenterostomy have been satisfactory in every way. This operation is indicated when the constricted area is of wide extent, and when adhesions prevent mobilization of both pouches.

Gastroplasty has a limited field in the treatment of hourglass contraction, due to the fact that it is suitable only when the pouches are movable, their walls free from induration, and the constricted area narrow. It is simple, easy to perform, and permits direct inspection of the interior of the stomach, thus affording an opportunity for treating an active ulcer by excision or cautery application. It may be combined with pyloroplasty or gastroenterostomy if the pylorus is stenosed. Four patients were operated upon this method. In one the cautery was applied to the ulcer and gastroenterostomy added, and in two the ulcer was excised and in the fourth gastroplasty was combined with pyloroplasty after simple gastroenterostomy had proved unsatisfactory. It is interesting to note, that at the second operation, on this patient, the stomach-wall, which had been indurated at the first had become soft and pliable so that the plastic operation was done with great ease. The end results in this group have been most satisfactory, although in one the hourglass deformity, to a certain extent, persists to the present time, three and one-half years after operation.

Gastrogastrostomy is especially adapted when the stomach is adherent along its lesser curvature to the liver, when the pouches are relatively large, nearly equal in size, and can be approximated at their dependent portions. The stomach-wall should be free from induration at the site selected for the anastomosis. The pylorus must be patent otherwise pyloroplasty or gastroenterostomy will have to be added. Gastrogastrostomy was performed three times in this series with complete clinical recovery in each instance. One of these patients has been followed for nearly nine years.

Medio-gastric resection or resection in continuity is the ideal operation for hourglass deformity of the stomach, provided the pylorus is not stenosed, and should be performed under such conditions. The ulcerated area, active or quiescent, as well as the constricted portion of the stomach-wall is removed

by this method. The end results obtained demonstrate the value of this procedure. Unfortunately, it is limited to the patients with few adhesions when the pouches are fairly large, and permit of free mobilization. It is a longer and somewhat more difficult operation to perform than those already mentioned, and for this reason, if the patient is in poor condition, should not be given preference over them. In order to overcome the tendency for the constriction to persist after resection in continuity a wide excision should be made. The radiograph of one patient taken subsequent to operation, illustrates the necessity of bearing this point in mind. Mid-gastric resection was the method adopted for five patients. Three perfect results seem to have been obtained; one patient has worked continuously as a domestic for over three years; another for two and one-half years; and the third operated on eight months ago has gained twenty pounds in weight. All symptoms referable to the stomach have disappeared. The fourth patient referred to above, in which the radiograph shows a persistence of the deformity, continues to have some distress in her stomach after meals although there has been no vomiting. She has gained in weight and has continued her work. The fifth died of pneumonia on the sixth day after operation. This patient was not in good condition and a less severe operation should have been performed.

The fifteen patients of this series surviving to the present time have been examined and checked by radiographs during the past few weeks. All have gained in weight, and with the one exception noted are practically free from the symptoms for which they sought relief.

The radiographs taken at considerable periods of time after operation demonstrate very clearly that the various methods employed have met the prime indication, that is, have overcome the obstruction. Whether the result obtained will be permanent in every case remains to be seen, but certainly some of each group have been followed sufficiently long to warrant the claim that a cure has been effected. From a study of the clinical results, I have come to the conclusion that each of the four operative procedures, above mentioned, gives equally good results provided the correct one is applied according to indications, and is executed in a proper manner.

I take this occasion to express my obligation to Dr. L. T. Le Wald, Radiologist to St. Luke's Hospital, through whose assistance and co-operation this report has been made possible.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, JUNE, 1918.

JOINT SURGERY

We have always considered infection of joints as one of the most fruitful problems for surgical study. There is scarcely a phase of the problem concerning which opinion has even reasonably settled; the pathology. The effect of lesions of the various component parts of the joint upon end function. The diagnosis, especially in relation to the utility of diagnostic puncture and, above all, therapy. Witness, for instance, even in the most recent years, how rapidly our therapeutic notions, concerning the treatment of infected joints, has fluctuated. First, we had "button hole" through and through, and long continued drainage, ending almost invariably (if the patient's life was spared) in firm ankylosis. Then came the wide mutilating open Mayo operations, which gave a lower mortality, but left the joint in even a firmer ankylosis. Then followed the injection procedures of Murphy which, while occasionally followed by brilliant results, not infrequently ended disastrously. The present status of the treatment of joint infections is in anything but a crystallized state, but it is hoped that the numerous opportunities furnished by this war will enable us to utter fairly definite convictions upon this subject. Our thoughts reverted to this topic in reading the unusually clear and well written paper of Eloesser (Boston Medical and Surgical Journal, April 25, 1918),

based on an extensive and keenly observed experience during the present war.

Eloesser starts out with the pregnant remark that the difficulties in treatment are largely mechanical; a joint is not a cavity but a series of more or less intercommunicating cavities. Furthermore, he makes a very apt comparison between the analogy of a joint and of the peritoneal cavity, and shows that we must regard the endothelial lining of the joint with the same respect as we have learned to deal with the endothelium of the peritoneal cavity. Eloesser classifies the sources of infection of a joint into four types: 1. Direct, by means of a missile; 2. Indirect, through a fissure in the bone; 3. Secondary, by spread of a neighboring suppuration; 4. Metastatic. The recognition of these various modes of infection is highly important, not only from a theoretical, but from a practical viewpoint. It is obvious, for instance, that if there is direct infections from without, the offending material must be removed as soon as possible. If there is, on the other hand, indirect infections from communicating bursae or joint fractures, the primary focus must be treated; resect, if necessary; resect prophylactically if manifestly infected. The third type—secondary indirect infection from neighboring abscesses—is fortunately rare. The dominant principle in this form of infection is to leave the joint alone unless it is surely involved. For metastatic infections, the indication is simple: evacuate the pus.

Whatever the origin of those infections, all may lead to similar pathological lesions. It is important, however, to recognize two distinct groups. The first is the suppurative form without deep involvement of the joint capsule; the second, the dry form, in which the capsule has become phlegmonous. "The whole future of the joint depends whether it is to be movable or permanently stiff and crippled, depends on whether the capsule is deeply involved or not—whether the bacteria are merely in the joint cavity or whether they have wandered out of the cavity and infiltrated the capsule."

We now come to Eloesser's method of handling a joint containing frank pus—a joint empyema. After removal of the foreign body, the pus is drained off; *the joint, however, should not be left open*. Here again, Eloesser argues that the treatment of a pus joint should conform to the principles which we have learned in treating a peritonitis. The now well-established dictum, "Allow the peritoneum to take care of itself,"

should be applied to the treatment of prevalent infections of a joint. We have long ago learned that if the cause of a peritonitis is removed, no extensive drainage or irrigations are necessary. So with a joint. "If it is kept open, exposed to the air or covered with gauze, both synovia and cartilage are lost—and the joint obliterates." Therefore, Eloesser recommends, let the pus out through a small stab, leave in a small drain until the pus disappears, and the discharge becomes serous. The drain is then removed and the joint allowed to close up spontaneously. Distension of the joint frequently ensues, and the patient may even run a fever. This, however, should not alarm the surgeon; the fever subsides in a few days and at the same time the swelling may recede. Eloesser is not positive as to whether irrigations are necessary or not; he believes that probably the Carrel-Dakin solution is the best antiseptic to use.

If the joint is an extensive series of cavities, it is important to recognize which portions are infected and which are not; only those portions that are infected are drained; the others are not, and he emphasizes the importance of not employing any procedures that may carry infection from infected to the non-infected areas.

In discussing the treatment of the second form of infectious arthritis, that associated with a capsular phlegmon (the clinical phenomena of which are set forth by the author in a masterly form), Eloesser says that the treatment is beset by many difficulties. "One will never cease to have patients who, whether they recover or succumb, one would wish to have treated otherwise." In these infections, the primary indication is to save life; the joint is hopelessly lost from the outset. The joint is therefore widely drained, all foci of necrosis and foreign bodies are removed, and the joint is filled or irrigated with the Carrel-Dakin solution. The limb is immobilized and must not be disturbed for unnecessary dressings. Too many are worse than too few. The difficulty is in knowing when amputation is necessary, if we decide too late, the man is lost; if we decide too early, a limb that might have been saved is sacrificed.

The remainder of Eloesser's article contains many specific directions for the treatment of individual joints, which we recommend those specially interested in this topic to read. There is but one other point which we deem sufficiently important to mention; and that is, the advisability of removal of all foreign bodies within the

joint, even if they have aseptically healed in. Such foreign bodies are very apt, in time, to cause roughening of the articular surfaces eventually resulting in a chronic deforming arthritis. Lead foreign bodies are particularly dangerous. The lead dissolves in the synovial exudate and settles as a grayish white deposit under the capsule. Such joints develop an uncommonly severe form of hypertrophic arthritis.—E. M.

THE AMERICAN MEDICAL ASSOCIATION

The 69th Annual Session of The American Medical Association will be held in Chicago, June 10-14, 1918. The characteristic enthusiasm of the medical profession undoubtedly will be enhanced because of the fact that war problems will play an important part in the general and sectional meetings. A military meeting, a patriotic war meeting, the presence of hundreds of men in uniform, the discussion of war methods, plans and regulations which are now being tested by practical experience will stimulate feelings of loyalty and patriotism in no uncertain way.

Programs of the sections on general and abdominal surgery, gynecology, orthopedics, etc., present a wealth of material whose meaning is far deeper than had been appreciated previous to our entrance into the war. There is no vast difference between civil surgery and military surgery except for the prodigality of operative work due to war injuries and the increased severity of a considerable proportion of the operations required. Rarely has there been such an opportunity for testing out the worth of surgical methods and technic. The numerous differences of opinions which have developed will approach nearer to harmony as a result of the interchange of opinions and experiences.

The demand for men will meet with a more ready response as a result of this national meeting which will bring to the attention of the profession a greater realization of the part the profession must play in protecting the lives and limbs of the American forces. The Chicago meeting will be largely attended owing to the central place of meeting and the participation in the various programs of representatives of every branch of the federal service together with representatives of the semi-official bodies charged with advancing the medical and surgical organization of the country. Those who attend the sessions will be repaid not merely by the benefits accruing from contact with fellow workers, but

by being placed in an atmosphere of loyal spirit responsive to the needs of the nation. The inspiration of this occasion will react most favorably upon the profession and encourage it to make the greatest sacrifices in behalf of national welfare.

The nation calls upon the profession for volunteers, and while almost 20,000 men have responded to the call, there is now an urgent need for 5,000 more to rally to the colors. The greatest triumph of the national meeting would be the completion of the roster sufficient to satisfy the present national emergency. Patriotism will be the key-note of the Chicago meeting. Words, speeches, applause, the wearing of flags and emblems, the singing of songs, may be evidences of the loyal spirit and a sense of enthusiastic support of governmental policies and play a considerable part in the development of a national morale. Wars require more than morale for their successful waging, and the most vital test of the Americanization of the profession is to be found in the responsiveness of the profession to the opportunity and privilege of donning a uniform and entering into the medical reserve corps.

Every physician and surgeon must ask himself the question: why do I not put my services and ability at the disposal of my government? This question merits a frank, conscientious, and truthful answer by each member of the AMERICAN Medical Association.

BLOOD TRANSFUSION IN MILITARY SURGERY.

The most astonishing thing about this brutal military convulsion which is shaking the world to its very core is the magnificent medical efficiency with which the wounded are being treated. The thin line of combat wavers very little, or not at all, and the facilities of the medical corps have gradually been approximated to those of the fixed community. Methods peculiar to civil life, which seemingly it would be impossible to utilize when the exigencies of warfare demand long marches and frequent and rapid changes of base, have assumed dominant positions in the surgical repertoire; a marvellous saving of life has resulted. One of these new factors is blood transfusion.

Two of the elements which tax skill in managing military wounds are shock and hemorrhage. The number of men who have died from these causes is almost uncountable. What better method than transfusion of blood for combating the loss of blood and for refreshing the exhausted

vital centres? A suggestion of the tremendous possibilities of this extraordinarily efficient therapeutic measure has recently been indicated in a report from the British medical services. American medical men engaged in duty abroad will, no doubt, make abundant use of this procedure. American surgery may be proud that the possibility of blood transfusion is due directly to its own ingenuity.—A. O. W.

A CORRECTED STATEMENT.

In the April issue on page 96 an error occurred with reference to the dosage of coagulen. We regret that the word "grains" should have been used in place of the word "grams." The abstractor, however, merely carried over the statement as it appeared in the journal in which the abstracted article originally appeared. The corrected statement should read, "Not more than five grams of the coagulen are to be employed at any time. When administered orally, five to ten grams dissolved in milk or tea."

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

PUBLICITY AND VENEREAL DISEASES.

As a result of military necessity, the Army and Navy have undertaken a broad campaign for the reduction of venereal diseases. Whether the underlying motive be on moral grounds or be based upon the importance of the physical service of a man is immaterial insofar as the end results are concerned. The aim is identical; namely, the protection of our military and naval forces from the inroads of venereal infection.

The Commissioner of Health of the City of New York recently transmitted to the newspapers for publication a statement to the prevalence of venereal diseases, and the intentions of the Health Department to assist the federal authorities in attacking this particular health problem as the foremost issue in its public health program. The newspapers failed to publish the communication. This refusal is indicative of the "conspiracy of silence" which must be broken down before adequate measures can be undertaken to control the evil. The prevalence of syphilis and gonorrhea is not appreciated by the general public and it is doubtful whether the medical profession itself fully recognizes the part that these black plagues play in the general problem of disease prevention.

Figures would indicate that syphilis and gonorrhea are the most prevalent of all infectious diseases whose consequences are responsible for more disease, invalidism, blindness, imbecility, general misery, and social difficulty than any other type of infectious disease ordinarily appearing in the community. Syphilis and gonorrhea rarely appear as causes of death upon death certificates, altho physicians realize that they form a serious factor in occasioning mortality. There is no lack of understanding of the statement of Osler, "of the killing diseases, syphilis comes third or fourth."

Vedder in his recent volume, "Syphilis and Public Health" points out in no uncertain way the dangers of syphilis to the general public. His compilation of statistical material merits most careful consideration. The part that these diseases play in the operative procedures of hospitals needs not to be emphasized to surgeons. Evidence from various sources demonstrates that the occurrence of syphilis among patients in hospitals and dispensaries is of serious moment not merely from the standpoint of the individuals afflicted, but from that of the general public, amongst whom these carriers of venereal disease live and work.

According to Kneeland, of 5380 patients treated in 13 New York hospitals in 1911, 6.33% were venereally infected, and these figures were independent of Wasserman examinations. During 1915 and 1916, 22% of positive reactions were secured in the investigation of pedlars, bakers and foodhandlers, though these figures were possibly a little higher than the community average, being based upon selected cases. The American Dermatological Association, after the study of 300,000 compiled cases, reported syphilis to be a causative factor in about 11% of them. The autopsies performed at Bellevue during the past ten years gave anatomical confirmation of syphilis in 6.5% of those autopsied. The Wasserman reactions at Bellevue for the year 1915, embracing 9891 routine tests, revealed a positive report in 30.5%. The records of the Post Graduate Hospital of New York for 1916 on unselected white patients covering 1168 males and 746 females show 28.4% positive males, 27.4% positive females. Walker and Haller studying the occurrence of unsuspected syphilis among patients at the Peter Bent Brigham Hospital found 15% complete fixation among the 4,000 patients investigated. In the Boston City Hospital, 500 unselected Wasserman tests by Hor-

non revealed 17.4% with positive reactions. Rosenberger reported the Wasserman reactions at the Philadelphia General Hospital during 1916 and although patients were not included in his study, 27.4% were reported positive. One might pile up statistical figures indicating the large number of admissions to hospitals and dispensaries for medical and surgical conditions with positive findings.

If to this vast number of luetics there be added the large number of patients seeking surgical relief for gonorrheal infections males and females—one could appreciate to what extent hospital attendance would be decreased by the conquest, partial or complete, of the venereal diseases.

It is essential that there shall be the fullest publicity given as to the exact status of venereal disease infection. It would be distinctly helpful to those charged with the responsibility of directing campaigns against syphilis and gonorrhea to secure the most up-to-date statistical data with reference to the incidence of these two diseases, the results of hospital and dispensary care, the frequency and character of the complications resulting from them, and the general end results of the medical or surgical treatment of the complications or sequelæ. The records of our hospitals and dispensaries are rich with material that would point a moral or adorn a tale to hold the interest of the press and public.

If the medical profession as a whole will get back of the Army and Navy and will support health officials in making known the ravages of venereal diseases, much will be accomplished. If medical societies were to issue demands upon the public press that they cease to talk in terms of concealment of "certain diseases", "social diseases", "blood diseases", terms which cannot be understood unless one is aware that syphilis or gonorrhea is meant, they would be serving the public wisely and well. There is no sound reason why the words syphilis and gonorrhea should not be used in the public prints. The journals which carry the advertisements of alleged medical concerns or individuals, offering their services for the treatment of "private diseases" should begin to realize that these alleged "private diseases" are of the utmost public consequence. The general mass of the population receives most valuable education thru newspapers. It is therefore important that the press be educated up to its duty and responsibility with reference to gonorrhea and syphilis. The

doctors, the surgeons, the hospitals, the dispensaries, have a convincing message which the American people will listen to with chagrin, humiliation, and indignation, when their facts become common property. The profession again, is called upon to serve the public by making known in every way possible the inhumanities of the ravaging venereal monsters, gonorrhea and syphilis.

Any attempt to control the venereal diseases or to limit the social phenomena giving rise to them is dependent upon public opinion. Public opinion can be formulated, organized and directed only on the basis of exact knowledge and information. The main problem today is the development of an intelligent, rationalized, public opinion concerning the prevalence and dangers of gonorrhea and syphilis.

Book Reviews

Modern Urology. In Original Contributions by American Authors. Edited by HUGH CABOT, M.D., F.A.C.S., Chief of the Genito-Urinary Department of the Massachusetts General Hospital; Assistant Professor of Genito-Urinary Surgery in the Harvard Medical School, Boston, Massachusetts. *Volume 1 and 2.* Illustrated with 632 Engravings and 17 Plates. LEA & FEBIGER, Philadelphia and New York, 1918. Price, \$14.

The rapid development of urological science serves as an adequate reason for the publication of a brief system on the subject. The fact that the contributors are all Americans makes the present two volumes a standard American book of references for those interested in the subject. Volume one, considers diseases of the penis and urethra, scrotum, testicle, prostate and seminal vesicles, while volume two is limited to the discussion of the diseases of the bladder, ureter and kidneys.

Despite the evidence of careful editorial supervision one notes a wanted unevenness which is generally characteristic of works written by a large number of authors with varying points of view and methods of approach. The subject matter being purely urologic, one fails to secure a complete picture of many of the diseases. This is particularly noteworthy in the discussions of gonorrhea and syphilis, which cannot be discussed in their various constitutional manifestations when they are considered in relation to only a single system of the bodily organization. Similarly it is difficult for one desirous of obtaining specific information to be certain of the completeness of the facts contained due to overlapping of discussion, as a result of individual contributors being in a sense partially ignorant of the subject being treated by other contributors. As an illustration of this one might refer to the fact that there is less discussion of syphilis of the bladder in volume two, to which diseases of the bladder belong, than in volume one, in which there is no direct place for the discussion of cystic diseases.

In the general method of organization of the text there is a happy combination of didactic narrative and the case method of presentation, the apparently a uniform plan was either not proposed to, or not accepted by, all the authors. The group of bibliographies at the end of each chapter is fairly well carried out in plan, and adds very much to the general value of the system to those interested in referring to the original sources. Here again, there is inequality, as for example in volume two, there is only one book on reference for the excellent chapter on Tumors of

the Bladder, none at the close of the chapter on Foreign Bodies in the Bladder, while there are fourteen references on Stone in the Bladder and 57 on Tumors of the Kidney.

The choice of specific authors reflects favorably upon the judgment of the editor and indicates the strength of the urological force in this country, altho the profession has not been drawn upon further west than St. Louis, nor further south than Baltimore.

Most of the criticisms above mentioned, at once apparent to the reviewer, were fully recognized by the editor who quite properly states that while these considerations are perhaps objectionable in a work designed for students, they are of less consequence in volumes intended for the assistance of the profession at large. Inasmuch as the editor recognizes that the two volumes practically represent, "a correlated set of monographs," it is only fair to appraise the results of his efforts upon this basis. It must be acknowledged that the contributors have made successful and meritorious contributions which have been carefully and skillfully arranged and compiled without destroying the individualities of any writer. The sum total may be regarded as a satisfactory exposition of urology, as developed and improved by a large number of capable diagnosticians, therapeutists, surgeons, and pathologists, whose experience in genito-urinary work has given them the requisite training and background to speak authoritatively upon the subjects to which their names are appended.

Health by Instruction. An Effort in Favour of a Biologic Teaching. LUIS SUBIRANA, Cirujano-Dentista, Professor of the Dental School of Madrid. English Translation by FRANK J. YOUNGER, D.D.S. Madrid, SOCIEDAD DE ARTES, Fuen-Carral, 137. 1918.

The dedication of this volume to his professional friends and colleagues of the United States was a gracious method of expressing the admiration of the translator for the accomplishments and ideals of his American brethren. In the light of this expression of international courtesy and amity, it is unfortunate that one must record faultiness in the translation. If one were not conscious of reviewing a book dealing with a serious topic, one might fancy that the English was designed to represent a burlesque of the translator's art.

The original work of the author merited a better fate because the language re-translated into Spanish gives evidence of a thorow understanding of the problem he discusses. The subject matter concerns the importance of education and instruction in the relation of teeth to nutrition and health. The text covers satisfactorily the importance of mastication, the effects of malnutrition upon dental structure, the influence of improper feeding upon caries, and the dire effects of caries upon the physical and mental development of individuals and races.

If the translator had had the guidance and counsel of one acquainted with the art of English writing, the value of the book would have been greatly enhanced. Despite the difficulties, however, under which the reader must labor, there are many suggestions of distinct value to those interested in advancing dental hygiene thru systematic and organized education.

Lessons from the Enemy. How Germany Cares for her war disabled. *Medical War Manual No. 5.* Authorized by the Secretary of War and under the Supervision of the Surgeon-General and the Council of National Defense. JOHN R. McDILL, M.D., F.A.C.S., Major, Medical Reserve Corps, U. S. Army. Illustrated. LEE & FEBIGER, Philadelphia and New York, 1918. Price, \$1.50.

Whether in military service or not, the reader of McDill's book will be amply repaid by a careful study of it. No problems are of more significance at the present time than those centering about the care of the war disabled. Intelligent organization takes advantage of knowledge gleaned from every source and to learn from the enemy is an evidence of foresight and sagacity.

Beginning with a concise description of the German medical military organization in war, there follow chapters devoted to the discussion of the administrative methods

of the sanitary service and the method of operation of the military base hospitals in Germany. The most significant chapters from the standpoint of American progress are those devoted to the re-education of the war disabled and the orthopedic hospital schools and workshops. There is a wealth of suggestion in the portion of the book given over to the discussion of artificial limbs or prostheses.

The point of view of the author, his attitude of inquiry, interpretation and weighing of methods merit particular commendation. In the present state of mind with reference to war cripples there is a large amount of valuable material carefully compiled and intelligently discussed, which should prove of advantage in perfecting American organization for the care of war cripples. The illustrative material is unusually well selected, and the large number of drawings and reproduced photographs enhance the value of the text. In many ways this war manual is one of the most constructive which has been issued under the authorization of the Secretary of War and the Surgeon-General.

Evolution de la Paie de Guerre. (Evolution of War Wounds.) A. POLICARD, Professeur agrégé à la Faculté de Médecine de Lyon. Duodecimo, 191 pages; 49 illustrations. Paris, MASSON ET CIE., 1918.

This volume takes up the description of the biological history of the wounds of the present war beginning with the pathological anatomy of a fresh wound and carrying the healing through to the end. The processes of healing and of infection plus suppuration are very lucidly described. A good description of the bacteriology of the wounds is also given. The mechanism of necrosis and tissue destruction is described as a proteolytic process in which bacterial ferments play an active part. The volume should be very valuable to all military surgeons.

Les Blessures du Cerveau. Formers Cliniques. (Brain Injuries.) CH. CHATEIN, Duodecimo, 199 pages. With a preface by Professeur Pierre Marie. Second edition. Paris, MASSON ET CIE., 1918.

This volume concerns itself with war injuries of the brain—including necessarily some discussion of cranial injuries—and the opening chapter details the methods of a neurological examination including radiography and lumbar puncture. The methods of localization are also outlined. A short description of the symptoms found with any brain injury is first given; and after that the parts of the brain are taken up individually and in detail. The volume ends with rather short discussions of the complications of brain injuries—meningitis and epilepsy. In these war times, when brain injuries are so common, the volume is timely and especially valuable.

Principles of Surgical Nursing. A Guide to Modern Surgical Technic. FREDERICK C. WARNSHUIS, M.D., F.A.C.S., Visiting Surgeon, Butterworth Hospital, Grand Rapids, Michigan; Chief Surgeon, Pere Marquette Railway. Octavo of 277 pages with 255 illustrations. Philadelphia and London. W. B. SAUNDERS COMPANY, 1918. Cloth: \$2.50 net.

This most excellent book deserves a place on the shelf of every nurse and doctor, especially for those who must perform operations in private homes either in the city or country. It discusses everything that one needs to know preparing for an operation and for taking care of the patient thereafter. Especially valuable are the chapters devoted to the early postoperative care and to the emergencies which may arise at that time. In preparing for the operation in a private home a number of things, which ordinarily would be considered difficult of accomplishment are made simple and easy by the suggestions of the author.

The book contains a number of very valuable formulae for use, such as those for various plasters and stipes, enemas, douches, etc. The book is enriched and particularized by a description of the duties of the nursing staff in a given operation, and quite rightly the common operation of appendicitis is selected.

Diseases of the Chest and the Principles of Physical Diagnosis. GEORGE WILLIAM NORRIS, A.B., M.D., Assistant Professor of Medicine in the University of Penn-

sylvania; Visiting Physician to the Pennsylvania Hospital; Assistant Visiting Physician to the University Hospital, and HENRY R. M. LANDIS, A.B., M.D., Assistant Professor of Medicine in the University of Pennsylvania; Director of Clinical and Sociological Departments of the Henry Phipps Institute of the University of Pennsylvania; Visiting Physician to the White Haven Sanatorium. With a Chapter on the ELECTROCARDIOGRAPH IN HEART DISEASE. By EDWARD B. KRUMBHAAR, Ph.D., M.D., Assistant Professor of Research Medicine in the University of Pennsylvania. 782 pages, fully illustrated. W. B. SAUNDERS COMPANY, 1917.

This is a very thorough and complete work on the theory and practical applications of physical diagnosis. The first part of the volume is written by Norris and considers solely the various diagnostic methods—inspection, percussion, palpation and auscultation. Much space and time are devoted to the underlying physical understanding of the art of physical diagnosis—thus, for example, acoustics as it has its role in medicine, is admirably presented and discussed. The chapter on normal variations of pulmonary percussion sounds is replete with helpful hints and cautions to avoid error. Particularly fine also are chapters on auscultation.

The normal breath sounds are explained, then the abnormal sounds presented with their distinguishing characteristics; finally the adventitious and voice sounds are properly observed in their diagnostic value.

The identical plan of consideration is carried out in the writing of the section on the circulatory system—part two. This is supplemented by a chapter on the electrocardiograph ably written by Krumbhaar.

Part three takes up the diseases of the bronchi, lungs, pleura, and diaphragm, and is written by Landis. Here the principles laid down in the first portion of the book are applied to the pathological condition of diseased organs or deranged systems. There is a wealth of information and an experienced judgment displayed in the skill with which each subject is discussed and beautifully illustrated by original and fine cuts. In fact all through this book the illustrations and diagrams and graphs deserve unstinted praise.

Premières Heures du Bessé de Guerre. (First hours of the wounded.) P. BERTIN ET A. NIMIER, with a preface by MEDICIN INSPECTOR JACOB. Duodecimo; 144 pages with 50 illustrations. Paris, MASSON ET CIE., 1918.

The authors are two of the younger surgeons who have had a long experience in the front lines; and in this volume, they discuss the experiences of any soldier from "shell hole to first aid station." The character of the modern battle line and the relation thereto of the medical service introduces to us a consideration of the character of the wounds encountered, of the complications and emergencies which must be immediately met, of the facilities which are available and of the methods by which these facilities are made applicable to any one case. The various ways in which the wounded are evacuated are described, as well as the various apparatuses which can be improvised on the field. Short chapters at the end are devoted to discussions of the regional wounds, thorax, abdomen, fractures, etc.

International Clinics. A quarterly of illustrated clinical lectures and especially prepared original articles by leading members of the medical profession throughout the world. Edited by H. R. M. LANDIS, M.D. Volume 1, Twenty-eighth series, 1918. Philadelphia and London, J. B. LIPPINCOTT COMPANY. Price, \$2.50.

This volume contains reports of the claims of Bishop, Hawes, Polak, Lespinasse, Kretschmer, Lahey and Cunstun. All of these are of timely interest and are excellently written. There are two very good papers on joint affections and on the pathology of the nails which are well worth reading. Among the other communications is one of W. Estell Lee describing the good results after secondary suture of infected wounds sterilized by Dichloramine-T. The volume is completed by a short general review of medicine for 1917.

Progress in Surgery

A Résumé of Recent Literature.

Ascending Urinary Infections: An Experimental Study.

YOUNG, L. L. *Surgery, Gynecology and Obstetrics*, February, 1918.

Injection of bacillus coli into unobstructed, non-traumatized bladders generally is not followed by a cellular exudate in the submucosa or muscularis. The colon bacilli may remain in such bladders for a month and may be isolated as such, although no lesion was produced by it.

Blood stream infection does not accompany acute, high-grade cystitis in obstructed and non-obstructed bladders. Cystitis in unobstructed bladders commonly is not accompanied by extension of the infection to the upper urinary tract. The infecting organism may be found in the ureter or the pelvis of the kidney in partially obstructed bladders, the extension being by the ureter, lumen or by contiguity of ureteral inflammation or via the periureteral lymphatics and the infection of the subpelvic tissue. Extension upward by means of the ureteral lumen is the most frequent. While periureteral infiltration is present only when a peritoneal exudate of the bladder or pelvic peritoneal exudate is present, it does not mean the same as an infection of the urinary stream. In such instances the kidney parenchyma usually is negative.

When the ureter is ligated and divided and an infected hydromphrosis is present, the infection may take place by spreading through the periureteral lymphatics to the subpelvic fat and by contiguity involve the pelvis of the kidney. In these experiments this process did not progress rapidly in point of time.

Trench Nephritis. J. C. McWALTER. *The Medical Press*, December 20, 1917.

McWalter points out that the men who develop this type of nephritis have all been inoculated for typhoid and paratyphoid; many have received doses of anti-cholera or dysentery serum, and they had all lived to a great extent on frozen meat and tinned milk, with occasional biscuits or bread.

These patients look well, but have extreme weakness. There is no edema, but the patients look bloated. There is much lassitude, frequently headache, but no marked anemia. The urine output is not diminished and the loss of albumen is rather small. After recovery, exposure and exercise induce relapses, so that once this condition has been contracted, the patient is of little use for active service.

There seems to be no definite etiology established. Alcohol appears to have no definite bearing on this condition. The treatment is symptomatic.

Excision of Vesical Diverticula after Intravesical Invagination by Suction; A New Method. HUGH H. YOUNG. *Surgery, Gynecology and Obstetrics*, February, 1918.

Young has developed an ingenious method of operating upon and removing vesical diverticula by invaginating them into the bladder. He inserts glass tubes through the bladder opening into the very depth of the diverticula and then applies the electric air suction pump. The diverticulum is thus sucked into the tube and then is grasped with forceps while the glass tube is removed. The sac of the diverticulum is enucleated within the bladder after incising the mucosa at its base. Blunt dissection is used to separate the diverticulum from the underlying tissues. The ureter, if contained within it, is pushed back into the bladder. Intravesical closure of the defect following the removal of the sac follows, with drainage led down to it along the lateral wall of the bladder and emerging extravasically. The bladder is carefully closed with a permanent catheter or suprapubic vesical drainage is established.

Young claims excellent results in seven cases in which he employed this method. For the relief of the obstructive cause of diverticulum he does a plastic operation, punch or prostaticotomy.

Lithiasis with Bilateral Renal Involvement. W. F. BRASCH. Rochester, Minn. *Roston Medical and Surgical Journal*, February 28, 1918.

1. In 17.2 per cent. of the patients in this series there was bilateral renal involvement. The percentage of bilateral lithiasis was 12.3.

2. Bilateral as well as unilateral lithiasis occurred twice as often in the male as in the female.

3. Pain in bilateral nephrolithiasis was unilateral in 64 per cent. and absent in 8 per cent. of the cases.

4. Bilateral stones were found most frequently in the pelves and calices.

5. Combined renal functional tests were of practical value only when normal or extremely low.

6. To ascertain the comparative degree of function in the two kidneys, the functional test was of value only when it was zero or a trace, normal or excessive.

7. The functional test, x-ray examination and cystoscopic inspection may be insufficient in determining the degree of healthy renal tissue remaining, and exploration only can determine this.

8. Indications for operation: (a) the kidney with acute complications should be operated on first; (b) without acute complications the kidney with the better function should be operated on first; (c) occasionally simultaneous bilateral operation is advisable.

9. Patients may be inoperable because of renal insufficiency, secondary infection, kidney destruction or constitutional complications.

10. Patients with large bilateral stones causing no symptoms or complications, are better off without operation.

11. The operative mortality in this series was zero; the total number of deaths after operation, ten; these patients died less than a year following operation. The operative mortality with calcareous pyonephrosis is much greater than with other forms of bilateral lithiasis.

12. The recurrences in cases of bilateral nephrolithiasis was 20 per cent.; in unilateral lithiasis, as previously reported, it was 10 per cent.

13. When there is stone in one kidney the most common forms of disease in the opposite kidney are: pyelonephritis, pyonephrosis and hydronephrosis.

14. With unilateral lithiasis the opposite kidney may be so badly diseased that a preliminary operation may be advisable on that kidney.

15. Stone secondary to pyelonephritis, when removed, prevents further renal destruction, but is not of curative value.

16. When the nephritic element predominates, removal of the stone is not of much therapeutic value.

17. A single kidney has a great degree of tolerance for repeated operation for stone.

18. In a single kidney the phenolsulphone-phthalein output usually remains high in spite of the presence of an uncomplicated stone which is probably due to compensatory hypertrophy.

Oblique Inguinal Hernia. A. M. HARVEY, *Illinois Medical Journal*, March, 1918.

This is a report the hernia committee, appointed by the Congress of the National Safety Council in 1916. The essentials are as follows:

The storm centre is the oblique inguinal hernia which comprises 92 per cent. or more of all herniae. Incisional hernia, umbilical hernia, femoral hernia and direct inguinal hernia, all of which are admittedly caused by anatomical defects, are usually classified as due to sickness, rather than injury.

1. The sac is the essential part of a hernia.

2. Efforts made on the cadaver to force the finger through the peritoneum into the inguinal canal are futile.

3. For a hernia to arise suddenly there must necessarily be a pre-existing sac.

4. In examining a patient, no diagnosis of hernia can be made unless the sac fills with fluid or solid contents.

5. The peritoneal loop serves as a dilator for a latent hernia before the sac fills with solid contents.

6. There is a dimple over the internal ring in the peritoneum which may be deepened and widened by oft repeated increases in intra-abdominal pressure. It may

deepen to form a sac more readily if the canal is patulous. The latter element is helped by (a) inherited thin abdominal muscles; (b) excessive fat; (c) emaciation.

7. A hernia into a prenatal, or slowly acquired sac is not an accident.

8. The factors which increase intra-abdominal pressure are (a) coughing; (b) enteroptosis, constipation, etc.; (c) stricture, vesical tenesmus, etc.; (d) obesity.

9. Oft repeated increases in intra-abdominal pressure can cause the gradual formation of a hernia, but it is usually symptomless and a large hernia may exist before the patient becomes aware of it.

10. Direct violence may produce true traumatic herniae. Such are accompanied by intense pain, shock, vomiting, tenderness, swelling and ecchymosis; operation discloses hemorrhage and torn tissues but no sac.

Gastric Disturbances as a Part of Central Nervous System Syphilis. L. HARRY NEWBURGH, *Journal of the Michigan State Medical Society*, March, 1918.

It is brought out that (a) severe gastrointestinal disturbances in cerebrospinal lues are frequent; (b) these may form the chief complaint of the patient; (c) symptoms suggesting cerebrospinal disease may be vague or entirely absent; (d) the gastric symptoms may occur so early that none of the older signs of cerebrospinal lues are present and the correct diagnosis may depend entirely upon the examination of the cerebrospinal fluid.

Gastro-duodenal Perforation. A New Diagnostic Sign. W. T. FIELD, Salem. *Boston Medical and Surgical Journal*, Feb. 14, 1918.

As the result of his observations in three cases, Field announces a method of discovering air in the abdominal cavity by noting a shifting of liver dullness on change of position. When the patient lies on the left side, percussion over the liver shows tympany; if the patient is now turned to the right, the liver percussion becomes dull. This is due to the fact that in the first position the fluid sinks to the bottom while the free air goes to the top, while in the second position the reverse conditions obtain. Field believes this sign to be of considerable value. "If absent, in the presence of other positive signs of perforation, it may be disregarded, but if present in doubtful cases, it may be the deciding diagnostic factor."

Surgical Shock. J. ERLANGER, R. GESELL, H. S. GASSER and B. L. ELLIOT, St. Louis. *Journal of the American Medical Association*, Dec. 22, 1917.

In a preliminary report, Erlanger, Gesell, Gasser and Elliot describe experiments on dogs with the production of surgical shock which they arbitrarily define as a reduction of the arterial pressure to or below 50 mm. of mercury, together with the other usual signs of that condition. There were five methods used and the experiments are described and the results of each summed up. Four of the five methods, namely, obstruction of the inferior vena cava and of the aorta, injection of epinephrin and complete portal obstruction certainly produce the reduction of the blood pressure over a considerable part of the body. It is possible that the fifth method (exposure of the intestine) works in a similar manner. One of the above methods leaves unaltered the functional capacity of the brain, the spinal column, the heart, the vasomotor mechanism, etc. The obstruction of the aorta leaves the nervous factors intact. For these reasons the writers have developed a working hypothesis. Long lasting deficient blood supply starts a more or less extensive reaction, possibly of the nature of an inflammation. This causes engorgement of the small veins and capillaries and transudation of the blood plasma. If acidosis occurs in shock, might not this, the writers ask, also be the result of the deficient oxidation thus caused? They do not entirely agree with the current view that in shock the heart, the vasomotor mechanism, etc., are always normally active. From what they have done, they have gained the impression that under the influence of the low blood pressure of shock the heart, while not put out of action, has not the normal reserve and the vasomotor center does not respond as readily or markedly to reflex stimulation. They have evidence also that in shock the respiratory center is sluggish and is working

very closely to its lowest limit. Reports from the war indicate the occurrence of shock in the wounded soldier, when seen soon after receiving the wound, is very rare. It usually appears in patients giving a history of great exposure to cold and to fatigue after the receipt of the injury. The writers have not yet succeeded through stimulation of the vasoconstrictor center, either reflex or direct, in causing in animals a peripheral constriction sufficiently durable to start shock. Possibly this can be accomplished only in the conscious animal, and therefore not by laboratory methods.

Adult Rectal Prolapse. Two Cases and a Contrast. R. W. JACKSON, Fall River. *Interstate Medical Journal*, January, 1918.

Jackson reports two cases. The first was operated three times: by cauterization, the Tuttle operation, and finally by amputation, but in each instance recurrence ensued. Finally the Moschowitz operation was performed (closure of the posterior cul-de-sac by the abdominal route) with sigmoido-ventro-fixation, with complete and permanent cure. In the second case, the Moschowitz operation was done at once, also combined with ventral suspension, and the patient is entirely well. Jackson reviews the hernia theory advanced by Moschowitz and concludes that the operation devised by him is by all means the operation of choice for rectal prolapse, especially if combined with complex intraabdominal fixation of the uterus.

Traumatic Brain Surgery. MAJ. JOHN WESLEY LONG, M.R.C., *Southern Medical Journal*, January, 1918.

Civil life traumas of the brain resemble very closely military injuries in so far as they are modified by the character of the missile and the environment. The kinds of injuries are (a) brain traumas without visible wound; (b) scalp wounds with no apparent fracture; (c) gutter fractures of the skull; (d) depressed fractures; (e) penetrating wounds of the brain, such as punctured wounds (as from a bayonet); (f) wounds with a missile remaining in the brain; (g) and through and through wounds. Gutter fractures always have associated with them fractures of the inner table. Penetrating wounds are supremely destructive of the brain tissue. The most important complication is infection. Cerebral herniae also become infected.

The line of treatment includes (a) primary cleansing of the wound; (b) removal to hospital for operation; (c) x-ray studies; (d) excision of scalp and bone wounds; (e) discriminating removal of foreign bodies; (f) covering of the exposed brain; (g) complete or partial closing of the wound; (h) only superficial drainage except with abscess; (i) lumbar puncture; (j) prolonged rest in bed.

Recent advances in neurological surgery; especially in the diagnosis and treatment in brain injuries. WILLIAM SHARPE, *Journal of the Medical Society of New Jersey*, March, 1918.

The diagnosis and treatment of brain injuries have made many advances recently but the symptomatology, being exceedingly varied, frequently gives rise to much confusion. The more extensive the fracture of the skull, the less seriously the brain is apt to be injured and vice versa. The most dangerous brain injuries frequently have no fracture of the skull. The most important factor to be considered in the treatment is the presence and degree of increased intracranial pressure, and, when marked, the latter furnishes adequate indication for an emergency operation.

The symptoms of advanced intracranial pressure include a lowered pulse rate, definite paralysis, and Cheyne-Stokes respiration. If allowed to go so far, an operation is of doubtful value. This should be anticipated by accurate methods of measuring the intracranial pressure, of which there are two: examination of the ocular fundus for papilledema, and estimations of the pressure of the cerebrospinal fluid by lumbar puncture. If the intracranial hemorrhage forms very rapidly and is of large amount, the patient usually dies within a couple of hours and choked discs have little time to form. It is of great importance to recognize the early stages of increased

intracranial tension by the oedematous blurrings of the disc. By this means, patients are not allowed to reach the point of secondary compression.

In selected cases of mild intracranial pressure the convalescence can be shortened and the symptoms relieved by repeated lumbar puncture.

There are two periods when operation is contra-indicated: the primary period of severe shock; and the terminal condition of medullary collapse. It is emphasized that no patient with high intracranial pressure be allowed to wait; he is to be operated upon immediately. The x-ray is invaluable in all cases, but one should not wait for this when there is present increased intracranial pressure.

The operation of choice is a subtemporal decompression. If the pressure is so high that the brain bulges through the opening, it is wise, in selected cases, to repeat the operation upon the opposite side immediately. After recovery, the patients should not be permitted to engage in their ordinary occupation for three months.

The late results showed, that of the patients followed, 67 per cent. continued to have symptoms directly attributable to the injury.

Reparations Crâniennes, leurs Indications, le Choix des Procédés, les Résultats. (Indications, Choice of Operation and Results of Cranial Reporative Operations.) CHARLES VILLANDRE, *Revue de Chirurgie*, July-August, 1917.

The indications for operation are the large size of the defect, its location, the presence of significant symptoms, fragility of the scar and esthetic reasons. The contra-indications are the opposite of the above plus the tension of the scar, and hypertension of cerebrospinal fluid. During operation, the scar is excised as much as possible, and an attempt is made to restore the normal layers. The best results are obtained from osteo-periosteal grafts, from cartilage grafts, and from cranioplastic operations. Operation is done under a general anaesthetic.

The results have been very good; the symptoms have disappeared or been much ameliorated (headache, convulsions, vertigo). No case has been aggravated. The result is superior to the protection afforded by an appliance.

Paget's Disease of the Bone: Excellent Repair after Surgical Operations. ROBERT ABBE, New York. *Journal of the American Medical Association*, Feb. 9, 1918.

Abbe says that although Paget's disease appears first on some isolated bone, it is not essentially a one-bone disease. Usually it is noticed in a curvature and enlargement of one tibia, femur, clavicle or ulna. Nevertheless, in almost all cases, the roentgen ray will reveal a thickening of the frontal, parietal or occipital bones, sometimes to an enormous degree to an inch in thickness. The essential condition is one of chronic osteitis, productive of spongy overgrowth, with absorption of the compact structures in the long bones, and occasional development of cysts lined by epithelium, sometimes filled with fluid or granulation tissue. In the skull, the enlargement is never at the expense of the cranial cavity. Occasionally, though rarely, a sarcomatous degeneration may follow. The disease is not so uncommon as would be implied by the lack of knowledge concerning it and the number of cases that go unrecognized. The object of the writer's paper is to call attention to its not infrequent appearance in the jaw bones and the admirable repair of the diseased bones when surgical treatment is required. In fourteen private cases of this disease seen in recent years, four cases with jaw complications have come under his notice and in two of these, excellent results were obtained by an extensive surgical operation. In one case, a lawyer was restored to useful life by a bold and successful operation, which the writer describes.

Spiral Fractures of the Tibia. C. DAVISON, Chicago. *American Journal of Medical Science*, March, 1918.

Spiral fractures of the tibia are usually due to indirect violence and are accompanied by fracture of the fibula, the latter usually impacted in rotation. The fracture of the tibia is uniformly at the junction of the middle and lower thirds; the fibula, on the other hand, is usually

broken at its upper part. Reduction of spiral fractures of the tibia by external manipulation and extension is not possible while the impaction of the fibula remains. Even when the fragments of the fibula are liberated, it is usually impossible to reduce the fracture in the tibia because of the entanglement of the upper end of the lower fragment of the fibula. For this reason treatment of such fractures by external mobilization is usually unsatisfactory, because the result is either poor union or non-union of the tibia. For these reasons, Davison advises open operation, preferably with transplantation of bone. Davison describes the technique and reports three such operations.

Analgesia. J. H. GWATHMEY, M.D., New York, and H. T. KARSNER, M.D., Cleveland. *Journal of the American Medical Association*, April 6, 1918.

J. T. Gwathmey (New York) and H. T. Karsner (Cleveland), France (*Journal T. M. A.*, April 6, 1918), after remarking on the frequency of fracture in war wounds and the need of keeping such patients quiet to avoid pain, say that general analgesia produced simply and quietly without removing the patient from his bed, is the logical solution of this difficulty. It is, of course, applicable to practically all painful dressings, and is being adapted to short surgical operations. In such operations, however, it is sometimes necessary to supplement the analgesia with procain, a hypodermic injection of morphin, or even by light inhalation anesthesia. Experiments were made on rabbits. The analgesic was administered by a stomach tube after which the animals were immediately released and placed under observation. Various drug combinations were used and they were not especially successful, but with rabbits the best results followed the use of ether in oil. Olive oil was found, however, to be irritating to the stomach, and liquid petrolatum was substituted in the clinical experiments. The mixtures containing paraffin much less so, but at the suggestion of Major Lower, this difficulty was obviated by sandwiching the doses of ether-oil between two ounces of port wine, given separately. While it is well not to give the analgesic just after a meal, no special preparation is necessary. Six cases are reported briefly in which this method was successfully used. Chloroform was substituted in the later tests, and found even more satisfactory. The authors conclude that, from these observations, it appears that general analgesia is safer than general anesthesia. Fifty per cent. ether in petrolatum, or other bland oil, is probably the safest general analgesic, causing apparently no bad effects on the stomach and is not followed by the nausea and vomiting common to ether anesthesia. It can be taken without disagreeable taste by the sandwich method mentioned, and is especially indicated for dressing painful wounds without removing the patient from his bed or ward.

An Experimental Study and Clinical Study of Chloroform, Ether and Nitrous-Oxide-Oxygen in Pregnancy and Labor. C. HENRY DAVIS. *Surgery, Gynecology and Obstetrics*, February, 1918.

Davis found that the prolonged administration of chloroform, ether or nitrous-oxide-oxygen to pregnant or non-pregnant animals, if repeated on successive days, causes degenerative changes in the tissues. The changes found in the liver are the most constant. Those following the use of chloroform are the most severe.

Nitrous-oxide-oxygen and ether induce cell-asphyxiation, while central necrosis is more marked following the use of chloroform. Ether has a less dangerous influence upon the fetus in utero than the other two anesthetics. Pure oxygen does not remove the danger of prolonged chloroform administration.

The nitrous-oxide-oxygen inhalation analgesia, however, has no deleterious effect upon the fetus, as four or six inhalations at the beginning of the contraction can scarcely disturb the normal metabolism. The effects are gone by the end of the contraction and normal metabolism is not disturbed during the interval. Prolonged operations during pregnancy should be avoided, but, if necessary, ether appears to be less harmful to the fetus in utero or to the new-born than chloroform or the gas.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

JULY, 1918.

No. 7

SOME POINTS OF INTEREST IN BONE SURGERY WITH SPECIAL REFER- ENCE TO BUNION WORK*

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Not many years ago, bone surgery consisted almost entirely of the treatment of osteomyelitis and similar conditions, together with the adjustment of fractures, simple and compound, trusting the outcome to the mysterious processes of nature; and the results were passably good. Reconstruction and conservation of bone tissue were desired, but not fully realized. Later, however, when the injury was very severe, greatly disorganizing the osseous tissue, so that nearby and very important articulations, like the elbow, the ankle and the wrist were rendered quite useless from lack of mutual support from the bones above or below the joint, surgeons began to look for some new material or method of treatment by which to hold ununited fragments together, or to serve as a substitute for the bone lost or carried away by accident or subsequent supuration. Consequently, bones of animals, as the sheep or the rabbit, were carefully selected and fitted in to fill the break. After much discouragement and many failures, this was given up. We might have known better from scientific reasoning, for blood cannot be transfused safely from animal to man. This was first tried centuries ago, but because of the tendency to fatal hemolysis, it too, was finally laid aside. If the human organism is not constituted to receive and utilize blood taken from animals, thereby mixing the species, naturally, heterogenous transplantation of bone would share the same fate as transfusion, for blood is essential to the life of all tissues.

Whether we are entirely familiar with the physiology of the blood or not, it is patent that if the body were deprived of the peculiar function of this complex fluid, for even a short time, bone regeneration, as well as all other reparative processes, would suffer loss. Note the far reaching results of vascular change in the aged; the depressing effect of serious hemorrhage in younger subjects. Surging along with terrific force, the blood never ceases its

beneficent toil until the very heart muscle, one of its many dependencies, is held in the grip of inactivity. Everladen with reconstructive power, it lashes the stronger tissues with its constant ebb and flow, the meanwhile softly bathing the delicate brain cells which, in clever response, give out their finished products—deep thought, pleasant dreams, hopeful anticipation.

One would hardly expect that bone or muscle could long tolerate such foreign bodies as nails or screws. Doubtless, the time will soon come when the Lane plate will be used rarely. But the splendid work of Mr. Lane, in its effect upon the evolution of bone surgery, will live on. Could the Lane plate always be removed without a rather difficult secondary operation, it would be an ideal splint, for many fractures, during the stage of callus formation. Unfortunately, when the osteogenetic process has served its purpose of uniting the broken fragments, and of fusing together, in proper relation, the various layers, periosteum, endosteum and intermediate bone, the steel work, if left in, often becomes a menace to the final stage of bone regeneration. Indeed, as a proof of this, the plate may be extruded in part, or require complete removal. One thing is true, however, if a sterile small nail or screw can be so placed that it subsequently becomes well covered or encapsulated, though not essential to the part, it may never give rise to untoward symptoms. This is shown by the receptive power of the tissues after nailing in fracture of the femoral neck; and in fixation of the great trochanter, following preliminary detachment for arthroplasty of the hip joint.

All steel plates, screws, nails or wire, whether large or small, are intended only as a substitute for callus; for there is little argument to prove that, without bony union, their presence adds anything to the supporting power of the limb.

The pioneer work of the late John B. Murphy, though much criticised at times, will serve as a foundation upon which to build a more perfect system of bone surgery, for decades to come.

Having learned considerable by experiment, and quite as much by failure, we have at last reached the place where we no longer doubt the superiority of autogenous bone grafts, pegs, or inlays over all other materials. Some time has been required to

*Read before the Oswego Academy of Medicine, December 12, 1917.

accomplish this, but the necessary training has given us keener insight, and wider comprehension. Nature is most wonderful in preparing her devotees to master the unusual. But we must follow her leadings. Every time we deviate from that which is right and rational in surgery, though acting in the best of faith, and seek improvement in the use of cumbersome, unwieldy methods, confusion replaces order, and we find ourselves as helpless to go on as a prattling child to mend its own broken toys. But, if we are diligent, Science always comes to our rescue. Thus, in the field of surgical research, it frequently happens that, after months or years of sustained effort, we suddenly make a noticeable advance in the manner of doing things, and, immediately, the whole world is conscious of the change, and its beneficent effect upon humanity. It is because Science has shown us the more excellent way; and when she does this, we are amazed at the simplicity of that which, a few days or weeks before, seemed but an unexplorable labyrinth.

There is nothing simpler than an inlay of bone for ununited fracture, now that we know how to proceed. The graft is taken usually from the patient's tibia, measured and sawed with perfect accuracy, so that it will exactly fit the space in the defective part prepared for it by the proper instrument and with equal precision. If possible, periosteum should lie in contact with periosteum, and bone with bone. By this little device, a helpless, and often uncomely, member is made over into a useful and more desirable one. The transplant serves to fix the fragments until osteogenesis can unite them firmly together. A bone graft, not occupying the medullary canal, may live and accomplish the desired purpose, without its own periosteum. It is safer, however, to preserve the periosteum wherever possible. The controversy over this matter is well nigh settled. Generally speaking, better results may be looked for in otherwise healthy individuals. Bone may be grafted from one patient to another; but a syphilitic donor would be an unwise choice. If the patient is syphilitic and the graft autogenous, specific treatment should be instituted.

From the very beginning to the end of all bone operations, the greatest care must be exercised. The assistant and the operating room nurse should know their part. The field of operation, as well as every step in the procedure, must be thoroughly clean. The transplant is made with special reference to perfect adjustment. The bone, with its continuity restored by the graft, should not be shortened. Neither should it be rotated in relation

to its fellow, or to neighboring joints. A graft or transplant should be so designed and fitted in place that it cannot move freely and thereby vary the final position of the limb. Nor must it be so tight as to favor necrosis, loosening up at a time when fixation is necessary. Aseptic blood clots and bone chips, deposited about the fragments, seem to benefit, rather than hinder, the healing process. They really are not essential. The wound is closed and dressed in such a way as to be easily reached without disturbing the limb, which, of course, is well supported by a plaster cast, extending beyond any nearby joints, the action of which might seriously alter the alignment. The *x*-ray, used before the operation, and at stated times after, will give valuable information as to whether or not the graft is slowly disintegrating. It will also determine the rapidity with which the break, or deficiency, is being filled in by new bone formation.

What has been said above, applies surgically to nearly all parts of the bony system. The work must be absolutely aseptic, and free from all unnecessary traumatism. An architectural mind and some dexterity in the use of instruments, are of much help to the operator. Above everything else, he must have a careful and intelligent assistant.

All bone surgery requires skill and aptitude. Some operators seem to have poor results with their bone cases, though they are very successful in other lines. It is much the same with any professional work. A well trained mechanic may be able, easily, to do the preliminary construction, so very necessary, for a magnificent dwelling, but is not fitted to carry out the inside finish, and he might not desire to, appreciating the monotony of it all. For, here, some one is needed who is naturally adapted to detail, and willing to spend the time required to plan and frame the delicate mitre, properly cut and bead the costly material without waste, and gracefully fashion the fresco and cornice, so that when the building is complete, there will be a quiet and perfect blending of color and form. It is no discredit to any surgeon to refer to a colleague those cases which, in his own hands, might not be satisfactory. Most of us can do some things better than others. Bone work is far from fascinating; it is even irksome at times, and, from a medico-legal standpoint, is fraught with great responsibility.

Not only has bone surgery, in a general sense, made rapid progress lately, but the work done in the realm of joints has been truly wonderful. We long have been able to practice excision of joints for tuberculous disease, with quite satisfactory re-

sults. The same may be said of chronic synovitis, in which aspiration, followed by injection of various antiseptic fluids or emulsions, has given permanent relief. Under general anesthesia, guarded manipulation has produced a fairly wide range of motion in certain cases of fibrous ankylosis. But, formerly, when confronted by bony ankylosis in those articulations, of such great importance to the wage earner, as the elbow or the knee, fearing an unsatisfactory termination, surgeons were not very anxious to attempt any radical measure. Now, however, applying the more recent methods of artificial joint formation, it is safe to promise a fair amount of service in many cases of complete ankylosis which, at one time, would have seemed useless to undertake. Such is true of the hip and inferior maxillary joints, when, from a previous arthritis, they have been rendered absolutely immobile. By restoration of function in a case of this nature, the patient's life is simply revolutionized.

The operative work is simple, but must be extremely accurate. The surgeon must be able to mobilize the ankylosed joint with safety to all surrounding structures. Having done this, it is necessary to shape the articular surfaces so that, when finished, they will not only glide freely and easily upon each other, but move in obedience to the manifold strain put upon them by the part when in active use. It is not enough that a hip joint, so treated, should sustain the patient's weight in the erect posture; but it must not dislocate during adduction and abduction, nor refuse to support the body during the complicated act of ascending and descending an inclined plane. Perhaps the greatest test of efficiency in an artificial inferior maxillary joint is chewing food. In this articulation, and in the hip and knee, reconstruction is usually required on one side only. Consequently, the remaining normal joint safeguards the newly formed one.

The preparation of the fascial and subcutaneous flap is of some moment. It should be of uniform thickness, and large enough to cover every particle of denuded bone surface. Furthermore, it must be securely fixed in position. This flap may change its character, owing to continuous friction; but appears never to suffer complete annihilation. It fully compensates for the lack of synovial fluid, permits a painless, easy motion and gives the joint that natural, spring-like resistance to shock. If too much bone is removed, in preparing for a new joint, the relaxed extra-articular structures may not be able to prevent subluxation. The joint will also be proportionally weakened thereby. If the amount of bone removed is insufficient, the tension of the sur-

rounding parts will lead to necrosis of the inter-articular flap. In that instance, there will be more or less pain and limitation of motion, rarely ankylosis. One can do no better, in the work of new joint construction, than to imitate the natural state. Bones intended to act in the capacity of an artificial articulation, but having rough, undulating surfaces, will be a source of disappointment, both from the side of usefulness, as well as range of motion.

The after care of patients operated upon for bone lesions, is of the utmost importance. Some of them easily become discouraged, and set out to use the limb before the traumatized surfaces have recovered from the operation sufficiently to bear the more exacting strain incident to function. In this way, a callus which needed longer time for solidification, may yield; or, an interarticular transplant may become dislodged before union of its edges has taken place. Others require watching, that they do not prolong the period of rest, until atrophic and other changes take place in the muscles and nerves which, though hard to explain, very easily defeat the purpose of the operation. I have spent many long hours in conversation with individuals who, but for timely advice, would certainly have given up and spoiled an operation which, eventually, turned out to be satisfactory. Each case requires its own particular care. Some persons seem to recover from the most intricate bone operation, with very little assistance; while others, apparently against their own will, must be literally dragged through the period of convalescence. Much skilful work has resulted disastrously because, during the final days of treatment, the surgeon failed to estimate the value of personal supervision, and the rigid application of undesirable detail.

One of the smaller ailments, about which too little is said and done, is the condition known as a bunion, the location and nature of which is common knowledge. Often not large enough to appear troublesome, it may yet be so tantalizing as to give the patient continual discomfort. The pain caused by a bunion varies within the widest limits, and may be of the sharp, lancinating type, which is usually intermittent; or dull, deep seated and more or less constant in character; both types of pain are exaggerated by damp, cold weather, and by tightly fitting shoes, of social requirements, used to replace the looser one worn about the home. On the other hand, the symptoms may be irregular in all respects, coming on at a time when, considering the effects of pressure, they really should be absent. Indeed, the

tired housewife, with shoes laid aside at the close of the day, may suffer most.

A bunion, which involves the first metatarsophalangeal articulation, is commonly described as a bursitis. In reality, it is a partial dislocation, complicated by an inflamed bursa, with well marked pathological change about the head of the metatarsal bone. This definition may not be generally accepted; yet, in a large number of cases, we have found it to apply in every one. Our method of joint construction for bunion, which we think embraces some originality, is based upon a careful study of this articulation, both before and after operation.

The anatomy of the foot is familiar to every physician and surgeon; but, in this connection, several features may be referred to with profit. The foot, in some subjects, is very wide through the region of the transverse arch. If such a foot is exposed to the pressure of a pointed, narrow shoe, the large toe will be adducted, or carried outward. At first, when the shoe is removed, the toe easily returns to its normal position. After a time, however, the extensor tendon, also displaced outward, instead of making traction in the long axis of the foot, becomes shortened and, consequently, holds the toe in a state of permanent adduction. There is now a partial dislocation, which gradually increases until the great toe comes to lie under or over the second. The latter position is most common. Favoring this outward trend of the first toe, is the normal action of the muscles. During the process of walking, the toes are raised and adducted before the foot leaves the floor. This is true of every attempt to change the foot from place to place, and is easily recognized, even with the shoe on. Any abnormal crowding of the large toe against its fellow, therefore, must be greatly exaggerated by this frequent and very necessary pull.

The articular surface of the head of the metatarsal bone is more extensive than that covering the base of the first phalanx, so that a very slight deviation of the toe outward, exposes the articular substance to pressure greater than that which it was designed to have; the result is a proliferating osteitis. This process often goes on until the cauliflower excrescence of bone protudes through the skin. In that event, a bursitis would be quite impossible, since the bursal sac is either punctured or destroyed altogether.

A person with short toes is rarely troubled with bunions, the foot being more massive throughout, and less receptive to injury. When the second toe is longer than the first, all the toes are usually long,

and the foot correspondingly slender. These, more than any other type of feet are subject to bunions. A few cases are found among persons who have never worn tight shoes nor shoes unduly loose; neither do they recall having had any injury or inflammation in the region of this joint. No real cause therefor, can be ascribed here. One is inclined to believe that a small number of patients develop bunions, like arthritis deformans, without any well qualified etiology. I have purposely omitted several of the causes of the condition under discussion, commonly mentioned in the text books, on account of their unimportance. Lastly, there is some reason to conclude that bunions may be hereditary.

An intermittent and very painful bursitis is, of course, possible; but it usually improves under palliative measures. When a true bunion can be diagnosed, however, it is useless to temporize, and a radical operation should be performed, if the patient's general condition will permit. Such a course will reduce the suffering and greatly increase earning power.

The diagnosis of bunion should be made with certainty, for if the real condition is absent, and the patient is operated upon, the most skilful procedure is likely to be followed by pain and disappointment. The patient's story is of paramount importance. The surgeon is expected to cure the complaint uppermost in her mind. It may be severe pain, or a mild form of distress. Sometimes, there is a desire on the part of the individual merely to improve the appearance of the foot. This is honorable, and well worth while. Quite, often, however, the patient has suffered a long time, and wants relief. Both feet may be equally distorted, but, invariably, one is more painful than the other. Most cases are bilateral, and should be cared for under one anesthesia. And this is a point of much interest, as it allows the surgeon, while at work, to compare the two sides with the idea of symmetry; for it follows that, not infrequently, patients have been partial in their criticism, after a two stage operation, expressing regret that both conditions were not relieved simultaneously.

In the beginning of bunion surgery, we had fairly good results, but the work was crude and unscientific. Heavy forceps were used to clip off the head of the metatarsal bone, often fracturing the shaft, and leaving small fragments to interfere with joint motion. After insertion of the subcutaneous flap, many times without careful regard as to whether it entirely covered the articular ends of the bone, the wound was closed. Extensive resection, too, often

left so much space between the bones that an interarticular substance was really unnecessary. And the appearance of the foot when healing was complete, left no doubt as to the defective work done within. Now that new and better instruments have been devised for shaping the joint surfaces, the ultimate outcome of bunion surgery, as it is carried on at the present time, may be looked upon as both curative and cosmetic.

If possible, the inner aspect of the outer wall of the joint should never be injured, during the reconstructive process, because of the liability to post-operative neuralgia along the anterior tibial nerve, which supplies this region, sending a small twig to the articulation itself. The pain is referred to the interdigital space. The sesamoid bones are left undisturbed. They serve as a protection to the newly formed joint below, and help to strengthen the transverse arch.

In some instances, after operation, the large toe will tend to rest slightly above the floor level. Though a small matter, it may greatly annoy the patient. The difficulty is to be overcome by advancement of the extensor tendon, just before closing the original wound. If the tendon is completely severed, and left so, the toe will dip somewhat, and interfere with the natural gait in walking. The tendency for the great toe to resume the old habit of adduction, is always to be anticipated. This cannot occur, if some special instrument is used to shape the head of the bone, and the utmost care exercised is completely closing the joint. Joint closure is an essential element to perfect function, and is provided for during dissection of the transplant, as indicated later. The bursal sac may, by chance, form a part of the interarticular structure: a help, rather than a hindrance, for many of the characteristics of the bursa are likely to be developed in all artificial articulations, if the bones project into a closed cavity, are smooth and properly shaped, and separated by an adequate amount of subcutaneous tissue. The skin flap is made narrow so as to avoid the tendon sheaths above and below, and to place the scar over the area of least friction, namely, the inner side of the foot. The horizontal flap will be found much superior to the vertical, in many respects, and is amply supplied with blood. The patient should always be informed that a bunion operation, to accomplish the desired result, necessarily shortens the toe. Very little, however, if the more recent methods are employed, thereby conserving the bone in length. As a safeguard against infection, the entire preparation of the foot should be repeated, three to six hours before etherization.

A linear shaped skin flap, rounded in front, with base posterior, is first turned back, beginning slightly beyond the line of articulation. Next, an area of subcutaneous tissue, similar in shape, with base anterior, and large enough to fully line the proposed joint, is carefully carved out, so as to avoid the underlying structures. On reaching the joint, it is desirable to leave a collar of fascia, extending around the exposed inner portion of the neck of the metatarsal bone. The joint is then opened, and a part of the head of the bone removed with a Gigli saw. The reamer is now applied at various angles, until all superfluous bone is removed, smoothing and rounding the head in a most artistic manner, back to the ring of fascia, previously referred to. The depression in the base of the phalanx may sometimes need to be deepened to receive the newly formed head. At this juncture, the subcutaneous flap is carried into the joint, and fixed with fine catgut, so that the bony surfaces will always remain effectually separated from each other. The collar of fascia, already described, is now stitched, under considerable tension, to the interarticular structure, along the line at which it curves to enter the joint cavity. This completely closes the articulation, and serves as a check ligament against future adduction of the toe. The wound is closed without drainage. If infection should arise, there will be limitation of joint action.

After the third day, gentle passive motion is begun, and continued daily until healing is completed and satisfactory. The patient may be up in ten days; wear a soft shoe four days later; and resume her usual activities in five to six weeks. Not until several months have elapsed, however, will the entire foot come into possession of its former elasticity.

Arthroplasty for bunion is one of the most delicate operations the surgeon is called upon to perform. It presupposes a clear conception of all the active principles entering into the normal articulation, as well as the one which is to take its place. And, when properly done, it will so transform the appearance of these unsightly extremities, as to call forth unsolicited comment from the most casual observer.

THE ARMY SURGEON.

The army medical officer, like the sailor, must be a handy man. It is not enough that he is able to treat disease and wounds after the most modern and approved methods, but he must be fully competent as a sanitarian and hygienist. Now that so many civil medical practitioners have taken military positions the need for including training in sanitation and hygiene in the medical curriculum has been amply demonstrated.—*The Medical Record*.

HELIO THERAPY IN THE CURE OF DISEASES OF THE BONES AND JOINTS. REPORT OF ONE HUNDRED AND TWENTY-SEVEN PATIENTS.

WILLIS C. CAMPBELL, M. D., F. A. C. S.

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Fellow American Orthopedic Association; Orthopedic
Surgeon to the Memphis General Hospital, etc.

MEMPHIS, TENNESSEE.

The sun as a therapeutic agent was used by the ancients, and for centuries mention of this measure may be found in medical literature. Various savage tribes and animals, notably the dog, seem to divine the beneficial action of the sun light, exposing their bodies when ill to the direct solar rays.

The exposure of a part of the body, effected by disease, "local heliotherapy", has been employed with some degree of success, for many years in the treatment of various disorders of the skin and bones, but the systematic and scientific dosage to the entire body, "General Heliotherapy", is a comparatively new method, evolved and perfected by Rollier of Loysen, Switzerland, to whom full credit should be given. General heliotherapy, in contra-distinction to local heliotherapy, is of paramount interest at the present time on account of the number of "war wounds" amenable to the solar treatment. In fact the measure is now being employed in many of the military hospitals of France, notably the American Hospital, from which excellent results have been reported.

Downs and Blount in 1877 proved the antiseptic action of sunlight. The following year, (1878) Downs and T. P. Hunt showed that the bactericidal action of the sunlight was materially inhibited unless in the presence of free oxygen. However, sufficient evidence as to how the rays act as a curative agent in disease has not been produced and at present the evidence must be regarded as purely empirical.

Bernhard of Somaden, Switzerland (1,700 meters above sea level) noticed that the farmers hung their meats out in the sun to dry, and used this antiseptic drying method for living tissues in his sanatorium in 1902, and was the first to consider altitude of special advantage in local heliotherapy. Rollier, encouraged by Bernhard, established his present institution at Leysin in 1903. He now has three sanatoria at different altitudes, 1250, 1350 and 1510 meters above sea level respectively.

Rollier believes that all surgical tuberculosis is a general infection with local manifestations for which he exposes the entire body from three to seven hours daily. He regards the ultra violet or actinic-

rays as the curative agent, and calls attention to the fact that all parts of the spectrum (red, orange, yellow, green, blue, indigo and violet and the invisible spectrum ultra red and ultra violet) are more intense at high altitudes, and that seasonal variations in the width of the spectrum are not marked as in the lowlands. Such variations he regards as due to the formation of ammonia and nitrous compounds in the atmosphere from electrical phenomena, especially during the warmer months, which contracts the invisible spectra, (ultra red and ultra violet,) thus decreasing the effect of solar rays in summer, while in winter there are few sunny days in low countries, and the cold damp atmosphere, with excessive wind currents, does not permit general exposure. On the other hand at high altitudes there is less seasonable variation in the spectrum, more sunny days, and the air is pure, still and dry, permitting almost continuous insolation. De Quervain, Hussy, Bardenhauer, Witmar and Hirschberg concur with Rollier. On the other hand A. Treves, Barbarin, D'Oelnitz, Audion, S. Koffman, Jerusalem and others, consider heliotherapy equally effective in the lowlands. Rollier, however, admits that cures may be effected in the lowlands, but regards altitude of decided advantage. Apparently, with the exception of Bardenhauer who resides in Cologne, a rather cold damp climate, the point of view regarding altitude depends on the local habits of the individual observer.

My work extends over five years and has been conducted at Memphis, Tennessee, practically sea level, not influenced by sea shore or by altitude. The results obtained among the tuberculous were so encouraging that the method was extended to various other affections of bones and joints with marked success.

The administration of the solar rays is by no means a simple task, especially in private practice. The closest scrutiny is necessary at all times or the treatment will rarely if ever be carried to a successful termination. I have seen many failures resulting from a lack of appreciation of the importance of employing the measure in a scientific and rigid manner. Dosage and the reaction on the part of the skin and the general condition of the patient must be observed constantly. In treating syphilis we would not expect to obtain cures by presenting a patient with a mass of mercurial ointment and giving instructions to rub, nor would we expect curative action of the solar ray by bidding our patient to go out in the sun with the instruction "expose yourself as much as possible." Each case must receive detailed instructions as to length of time, the

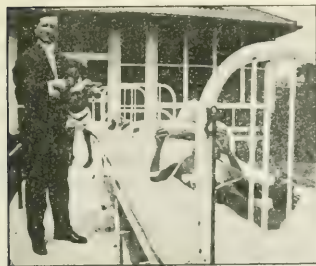


Fig. 1—Heliotherapy in negro children at the Memphis General Hospital.



Fig. 5—Showing some cases at one of the local institutions.



Fig. 6—Extreme case with multiple sinuses in tuberculosis.



Fig. 2—Inexpensive pavilion at private hospital to accommodate 15 to 20 patients.



Fig. 6—High cervical tuberculosis. Treatment, six months. No recurrence at the end of 12 months.



Fig. 10—Showing double contractures.



Fig. 3—Rollier position in private patient with sinuses, treated successfully in private home.



Fig. 7—Tuberculosis of right knee, two years' duration.



Fig. 8—After six months' heliotherapy. Note intense pigmentation.



Fig. 4—Mid-dorsal tuberculosis after one year's treatment in private home in crowded city district.

amount of body surface, etc. The greatest care must be taken to avoid dermatitis. The effect on the hemoglobin, white and red cells should be noted x -ray examinations must be made at intervals. The correct dosage for each patient should be worked out by experience. Some can stand frequent exposures for short intervals, others continuous exposure. Many are seriously affected by the mid-day sun, while some do well, regardless of the heat.

About five years ago, I became interested in heliotherapy, and first used the method on an apparently hopeless tuberculous spine and hip joint in an adult, with such a rapid and remarkable cure that I at once instituted the solar treatment in the orthopedic service of several local hospitals. Since which time I have been convinced that the beneficial effect on the diseased process is chiefly due to the action of the sun's rays on the skin surface of the entire body, for there is no comparison in the local and general improvement of patients simply living out of doors in the fresh air and sunshine and those on whom systematic heliotherapy has been properly administered.

A careful observation of the clinical course is most interesting; no material improvement is noted until pigmentation is well established, after which there is an increase in appetite, a decrease in temperature, the red blood cells and hemoglobin are rapidly increased, and also the body weight. The entire clinical picture may change within a very few weeks. In patients with fistulae the discharge becomes more copious, and after a few days thinner, then gradually serous and scant, finally healing in from three to six months. It has been my experience that ankylosis occurs when there has been well marked disintegration of bone, otherwise a normal joint is possible and was the result in several of my cases. Deformity can only be overcome or prevented by orthopedic measures, which should be rigidly employed in every case. The x -ray findings are most interesting, and are the most efficient guide, after clinical symptoms have subsided. One will notice in a well advanced tuberculous spine a destruction of bone as evidenced by wedging of the vertebrae, obliteration of the inter-vertebral disks, or total destruction with telescoping. The lamellae are vague and the bone thin and atrophic. Surrounding the affected area, especially in the dorsal region there often can be seen a rounded or spindle shaped inflammatory exudate. After a few months of insolation there is material change. Evolution of the process is evidently hastened, necrosed areas are being absorbed, the bone becomes more opaque, and by the end of six months is often thicker than nor-

mal, and apparently ankylosed. The inflammatory exudate becomes irregular, thinner, gradually diminishing in circumference, or at times undergoes calcification. In joints the process is analogous. One often will be surprised to see rapid destruction of joint surfaces after a few months exposure to the sun, when for a year or more little material change had been noted. This rapid evolution is probably due to the removal of devitalized tissue by natural forces stimulated by the tonic action of the sun, which in my earlier experience I deemed an acute exacerbation of the disease. These pathological changes shown by the x -ray also are evident in septic cases with sinuses, as above described.

A full discussion of the literature and the complete histories of fifty-one patients was read before the American Orthopedic Association in two articles (1915-1916) and later published in the American Journal of Orthopedic Surgery. (April 1916, Vol. XIV No. 4, January 1917, XV No. 1.) to which reference can be made for further detailed information.



FIG. 11—After three months' heliotherapy.

I have employed heliotherapy for one hundred and twenty-seven patients with affections of the bones and joints; eighty-seven were tuberculous; twenty chronic infectious osteomyelitis and twenty miscellaneous disorders.

Of the eighty-seven tuberculous, sixty-five were treated for a sufficiently long period to note the effect of the treatment on the local process. Twenty-eight have remained apparently cured for from one to five years. The lesions were localized as follows: Spine 13, hips 9, knee 5 and ankle 1, and eleven were accompanied by suppurating fistulae. Three had fluctuating abscesses, which were absorbed. Of the 65, twenty-five had open fistulae, fifteen of which became entirely healed. Four are healing rapidly at the present time, while two adults over 40 years of age have persistent lesions after two

years of intensive treatment. Eighteen to twenty-eight of the apparently cured were exposed for from six to nine months. Not one of the twenty-eight have continued treatment over two years. Of the twenty-one now under treatment only the two adults above mentioned with discharging sinuses, are improved, but not cured—the remaining nineteen show every evidence of an eventual excellent result.

Eleven could not be controlled for a sufficient length of time to effect a cure, but showed decided improvement.

Twenty were adults, six of whom are reported as cured, seven have improved and remain under treatment, two improved but did not continue treatment. Five adults with vertebral infections



Apparently Cured. T. B.
Knee After 6 Mos. Helio-
therapy, Showing Degree
of Painless Flexion.



Apparently Cured. T. B.
Knee After 6 Mos. Helio-
therapy, Showing Normal
Extension.

died, four directly or indirectly from the primary infection and one of an intercurrent disorder.

To summarize: twenty-eight were apparently cured; eleven improved but discontinued treatment; twenty-one now under treatment are improved; five adults have died; no deaths in one of the forty-five children.

Heliotherapy has been tried on twenty-one persons with chronic infectious osteomyelitis, following radical operation for the removal of sequestra. In eight instances insufficient time has elapsed to give results. Of the remaining thirteen twelve have been apparently cured for from one to four years. In one patient a double infection—left femur and right tibia—a small sinus remains in the femur after two years treatment and may require a second operation.

Second or third operations are often necessary with the present methods of managing osteomyelitis, but these have been avoided so far in twelve out of thirteen patients.

Of the twenty miscellaneous conditions, seven had intense general sepsis; in these the primary foci were in the bones and joints, but were not relieved by drainage. Heliotherapy was not given until all other measures failed and the condition of the patient was exceedingly grave. All responded favorably. Of the remaining thirteen, ten were non-tuberculous infections with pus and sinuses, which had persisted for months or years but perfect healing resulted after thorough insolation. These are analogous to many war injuries in which the bones, joints, or cellular tissues are involved. Under such conditions heliotherapy would undoubtedly conserve much tissue; often restore the injured parts to normal or put them in satisfactory condition for future operative surgery. In fact, most favorable results have been reported as stated above. In special institutions for the purpose, much undoubtedly could be accomplished in the way of military surgery at the present time, as the method must be carried out under most rigid discipline in order to effect the desired results.

Heliotherapy is far reaching in its effects and undoubtedly will be found of great value, not only in the treatment of affections of bones and joints, but for the cure of various disorders elsewhere in the body.

PREVENTIVE MEDICINE

"International Peace will be greatly aided in the future by preventive medicine" is a declaration made by President Emeritus Eliot of Harvard University. Dr. Eliot further said: "Preventive medicine is capable in the future of doing away with poverty and misery, of remedying industrial disputes, and of contributing to the cause of international peace." The medical practitioner of the future, he declared, would be one who prevented disease rather than cured. More than half the physicians of the country, he believes, will eventually be engaged in preventive rather than curative medicine. We may well add to the above that preventive medicine, and it alone, can control the insane and feeble-minded conditions, for it may be emphatically stated that insanity and moral problems cannot be solved by building hospitals, prisons and reformatories. It is also true that the highest and noblest form of charity is the prevention of poverty and immorality. Relief and amelioration are necessary because prevention is not practiced. Let us reorganize most of our charity and relief societies into prevention societies.—*Monthly Bulletin of the Indiana State Board of Health.*

SANITATION IN RELATION TO SURGERY.*

JOHN W. LE SEUR, M. D.

D. O. C. C. X. Y.

At a time when the world's thought is centered on the world-wide war any topic relating to the conservation of human life is worthy the attention of all thoughtful persons. Sanitation has a most intimate relation to the welfare of the soldier, and it is fortunate that within the last decade so much attention has been given to sanitation that the valuable results obtained are available for the benefit of the soldiers.

It will be readily admitted that the prime requirements for efficiency in the soldier is a sound physical condition, and wherever surgery in any of its branches is required for the soldier the work of the surgeon is made easier and the results of his work are more satisfactory in proportion as the subject is in good sanitary condition. Hence sanitation in its relation to surgery may be said, first, to relate to the selection of men who are to serve as soldiers. Here, of course, the age of the soldier comes at once before us for consideration, and it has been definitely decided that the young and the vigorous shall be called first to this important service, but age alone is not a decisive factor. Adequate provision is made for the sanitary examination of the soldier, and his physical development, his general health and vigor, must be ascertained before he is admitted to the ranks, and the sanitary care which he has received in his youth has a direct relation to his availability when called to this important service. Sanitation goes still farther in some cases and even considers the psychological condition of the would-be-soldier. But this is aside from our main purpose and need not be further considered here.

When sound men have been selected for service, the next step is the training of these men for their work, and here too sanitation has its mission, as the education of the soldier-to-be must necessarily include such a knowledge of sanitary science as will enable him to know what to do and what not to do, and how to recognize and fight dangers to his health and to keep himself at his best under all circumstances. Certain sanitary knowledge is essential in order to maintain his power of resistance at the highest point and to enable him to endure a hard life as a sound soldier. His constant drill, and the care of his body after vigorous exercise must constantly have in view the sanitary care of the body

and the development of a vigorous physique and a mental attitude which will enable him to perform cheerfully and successfully the duties for which he enlists. Having trained young men along the lines of sanitary development and care we have prepared the best possible material for such surgical work as is inevitable in actual conflict.

Sanitation has a direct relation to surgery in the care of soldiers. This is true when on the march, at rest, or even in the enjoyment of recreation. Especial sanitary instruction must be given to soldiers on the march lest in a thoughtless moment they drink water that may have been contaminated, or waste the water supply which the canteen holds or use it unwisely at the beginning of the day's march and so suffer before the day is ended. The sanitary care of men at rest is also of the greatest importance in order that they may know the necessity of adhering to suitable sanitary regulations in the strictest manner in order to protect themselves and others. Soldiers at rest, particularly those who may have been exposed to cold or wet, require special care and intelligent aid in order to avoid becoming sources of infection to others. Even the recreation of the soldier must constantly have in mind the sanitary requirements of camp life in order to furnish the best field for the work of the surgeon when that work becomes necessary. Again, the treatment of wounds in modern warfare calls for the best results of sanitary science. Here the bacteriological work which modern sanitation has enriched is proving to be of the highest value in the surgery of war.

In a recent article entitled "Bacteriology and the War," by Dr. David John Davis, this statement is made: "The relation of bacteriology and war is a reciprocal one, which the study of bacteria has most fundamentally effected the success and the methods of procedure in military campaigns. In turn, there is presented to the bacteriologist for solution many new problems of vital interest to the science; not only are new fields for investigation opened up by the war, but military organization furnishes a field for observation and confirmation of existing data on a scale and under conditions not usually possible in civil life."

During war the destruction of life by disease-producing germs *often*, indeed *usually* in the past, exceeds the destruction of life by bullets. Germ life develops so rapidly in the wounds of the soldier that the utmost care and the most strenuous efforts are called for to secure the most favorable sanitary condition for the wounded, and it is here that cleanliness, as far as it is possible to secure it,

* Read before the New York and New England Association of Surgeons, September 28, 1917.

is of the greatest value; the securing of the most favorable sanitary environment of the wounded is of the highest importance. Whether the treatment shall be prompt and bold incision, or the application of the chloramines, or the use of Benzol derivative known as Flavine, it is certain that in any and every case the more thorough the sanitary care which precedes the injury, and the more thoroughly antiseptic the treatment secured, the better the surgical results to be expected. The very important work which has been done by sanitarians, in the effort to discover the method of transmission of those diseases which are most destructive in civil as well as in military life, enables the surgeon to approach his work with more comprehensive knowledge and with greater confidence than ever before. The magnificent work which has been accomplished by the investigators and discoverers along the line of the prevention of the transmission of diseases, especially such diseases as yellow fever, typhoid fever, the so-called modern trench fever, has made the surgical work of the army officer vastly safer and more satisfactory. If we recall the sanitary work which has been done in the prevention of the transmission of diseases from army latrines to camp hospitals, we cannot fail to be impressed with the important relations which exist between modern sanitation and modern surgery. The exclusion of flies from the camp hospital, and the prevention of their liberal distribution of infection is a striking instance of the direct relation which exists between sanitation and surgery. Instances might be multiplied where lives have been and are saved by sanitary knowledge and its scientific use in the surgery of civil life as well as in the surgery of war.

All the time, and thought, and expense which have been devoted to the development of sanitary science have played a significant part in the preparation which has been made for successful war surgery, and we may take a just and a reasonable pride in the results that have followed the work of our greatest sanitarians in paving the way for successful surgery.

FIT OR UNFIT.

More and more we of today are coming to realize that crime, vice, drink, and poverty are due to mental unfitness on the part of the individual to cope with the world. As the years go by, society is requiring more and more of the individual—in making it increasingly difficult for him to keep his place in the struggle for existence. More and more complex are the conditions to which he must react, and his adaptability must increase accordingly, else he falls behind, fails "to keep up his end," and goes to a lower scale in the social standard.—L. E. DUVALL, M. D., in *The Medical Record*.

A SIMPLE METHOD OF ESTIMATING THE INDIGO-CARMINE OUTPUT.

JOSEPH H. SCHRUP, M. D.

DUBUQUE, IA.

After collecting the urine for a specified time, as in the Phenolphthalein test, the quantity obtained is diluted to one liter.

An amount of Indigo-Carmine equal to that used in the test is dissolved in ordinary water and diluted to one liter. An undiluted portion of this makes a 100% control; one-half strength, 50%; one-third, 33%; one-fourth, 25%; etc. If one wishes to check up on the Phenolphthalein test only, it is necessary to make up only the corresponding dilution. Test tubes or bottles of the same diameter are required for both the control and the specimen to be tested. A ground-glass back-ground is not required, but is advantageous.

I have found that the control dilutions, thus made, up do not keep. This is probably due to a lack of knowledge of the proper solvent, as of late ⁽¹⁾ an Indigo-Carmine apparatus has been put on the market.

It suggests itself that this same principle of dilution and control can also be used in a colorimetric determination of other substances ⁽²⁾.

1—Thomas and Birdsall: Comparative Results of Various Functional Kidney Tests, *The Journal A. M. A.*, Nov. 24, 1917, p. 1748.
2—Peoples and Lewis: A Simple and Accurate Colorimeter for Clinical Use, *The Journal A. M. A.*, Mch. 9, 1918, p. 680.

A BADGE OF HONOR.

A Liberty Loan button is a badge of honor. Rightfully obtained, it marks the wearer as one who has performed a distinct, definite service to the country.

Not all can fight, not all can work directly for the Government; but in buying a Liberty Loan Bond or War Savings Stamps every American renders some service to the Nation. It has been put within the reach and power of every citizen to aid the United States financially; it is a poor American who withholds support from the Government, from our soldiers and sailors fronting death on battlefields and oceans.

Iron crosses to German soldiers and diamond orders exchanged between Turkish and German sovereigns may be but the honors of atrocity. But a Liberty Loan button, simple as it is, signifies a patriotic duty done and is an insignia of honor.—*Treasury Department; Bureau of Publicity.*

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, JULY, 1918.

BRAIN SURGERY AT THE FRONT.

In view of the enormous frequency of brain injury during the present war, it seems strange that so few intensive studies have appeared in print. Statistical and casuistic data are common enough, but no one, it appears, has attempted to do anything for such injuries except along conventional lines. It is for this reason, that a recent paper by Harvey Cushing is of especial interest. Cushing's succinct article based upon the observation of 225 cases, teems with original ideas.

Cushing modestly admits that his experiences in brain surgery in civil practice, in which he dealt almost entirely with non-infectious cases, rendered him in a measure inadequately equipped for the kind of work he set out to do. The methods he has evolved, therefore, as evidenced by a reduction of the mortality from 54.5% (the generally accepted mortality) during the first month of his service to 28.8% during the last month, speak eloquently for Cushing's resourcefulness and originality.

First of all he insists upon the very great value of a preliminary neurological examination. This is important to determine how far paralyses are due to the trauma or to the operation; furthermore it may help one to decide whether the opening of an intact dura is justifiable or not, or whether a secondary operation for presumptive brain abscess is necessary.

Stereoscopic radiograms are obviously necessary in every case for the detection of missiles and penetrating pieces of cranium.

Cushing insists upon the necessity of shaving the entire scalp. He decries the use of such antiseptics as iodine or picric acid which are apt to leave behind scaly or encrusted epithelium. He prefers alcohol and bichloride.

The first important novelty that one meets with in Cushing's report is in regard to the anesthetic. He has been converted completely from his advocacy of inhalation anesthesia, and now regards local anesthesia as a prime advantage in brain surgery. A general anesthetic increases intracranial tension; it provokes bleeding from the scalp; it encourages the use of rougher methods, and especially speed "which is to be decried at the expense of delicacy." Moreover it promotes post-operative respiratory difficulties.

The plotting of the incision is important; flap incisions are sometimes feasible but for the ragged or gutter defects of the vault the tripod or three-legged incisions are most applicable.

The second novel recommendation is "trepanation en bloc." Cushing believes that the conventional method of excising a depressed fracture by the rongeur is bad, because the operator must work through an infected field, moreover, it entails an amount of trauma that the patient will not tolerate. Cushing encircles the depressed area with numerous punctures made by a burr, and connects these with a linear cut. The whole of the depressed fracture and the overlying infected scalp is then removed in one piece.

Cushing again offers novel suggestions in regard to the treatment of the wound track. This indeed is the most important step in the operation. Hitherto surgeons have advocated the use of the finger to explore such tracks. Cushing holds that such exploration is frequently disastrous because it causes greater trauma and drives loosened fragments of bone more deeply into the brain. He advises therefore a soft rubber flexible catheter, which can be driven into the smallest opening and is as delicate for determining missiles or fragments of bone as the finger. By attaching a glass syringe with a rubber bulb, the softened traumatized brain can be sucked out, and frequently as well, small bits of bone or missile.

Cushing advocates extreme conservatism in opening the dura. It should only be undertaken in cases where the neurological examination reveals local loss of function or in which the exposed dura is

tense and evidently overlies a clot or a severely contused area.

The removal of missiles should not be accomplished if such a removal involves increasing the damage already done. Once more, Cushing makes an original suggestion. He has found that the magnet removes missiles more surely and with less trauma than by any other method; indeed he regards it as the only justifiable method to remove deep seated magnetizable bodies from the brain. This method, in his view, is capable of wide possibilities.

Finally, Cushing regards the use of dichloramine-T dissolved in eucalyptus oil as one of the largest contributing factors in the reduction of his mortality. In not a few cases, in which the wound and bone fragments showed an abundant bacteriological growth, no infection occurred despite complete closure of the wound, after this antiseptic was employed. The antiseptic is injected in the pathway of the missile and just before closure of the scalp, the dural surface is moistened with this solution.

Few surgical papers written during this war have revealed a larger message or a more practical sense of the relation of brain surgery to general progress under war conditions.—E. M.

THE PROBLEM OF THE DISABLED.

The Great War is a war of nations in which the entire manhood is engaged. Very soon we, too, shall have seriously large numbers of wounded, of whom a few will be crippled in mind, and many, many more will be crippled in body. The problem of the disabled looms large on the horizon, much larger by far than in any previous war, and bids us prepare.

There will be men without arms and men without legs, and men whose limbs are distorted, as a result of frightful wounds, out of all human resemblance, and are useless, apparently, for any remunerative task. All of these will need care, care which will not result in large numbers of helpless dependents, but in wage earners, independent of charity or pension. The experiences of our British allies, in the handling of this problem as detailed by Colonel Sir Robert Jones, are very valuable. (*American Journal Orthopedic Surgery*, May, 1918.)

Fully fifty per cent. of the wounded have injuries which require for their proper care orthopedic principles and methods; these may be preventive or corrective. Unfortunately, with the character of the wounds which are seen, the initial sepsis is so violent as to force the concen-

tration of one's attention on the conquest of the infection. The bulk of the orthopedic work will, therefore, be corrective and will be carried out at a comparatively late period at bases far back of the firing line. Early evacuation from the casualty stations should be encouraged and the proper cases should be immediately congregated in "orthopedic centres".

The reconstruction of the cripple is a very large work and will demand the close cooperation of the official agencies as well as of the many voluntary institutions already in existence. It is important that each centre be properly and completely outfitted; that the surgeons be properly trained and full of enthusiasm; and that all the departments, and especially those for massage, electro-therapy and manual exercises, be in charge of a competent directorate for the purpose of securing a proper subordination and coordination of all. The restoration will consume much time,—six months, a year, perhaps longer; in that time there may be need of the services of many or all departments,—a desideratum much better accomplished under one roof.

Two factors largely influence the morals of these centres; first, sympathy, gentle methods and, above all, the patience of the staff; second, the direct mental and physical benefit to be derived from "curative workshops." The latter have proved very valuable. The governing principle in regard to this curative work is founded on the proven belief that active voluntary movements are of infinitely greater value than passive movements. The exercises which are employed may be direct or indirect. The indirect is often the best as "when a man with a stiff ankle is set to planing or sawing wood he unconsciously uses the ankle, as he gets interested in the work which his hands are doing". The periods of physical work are advantageously alternated with periods of rest which are employed in instruction; from the psychological standpoint this "secures the man's productive occupational treatment".

As many influences as possible—sympathetic, explanatory, persuasive,—should be brought to bear upon the wounded man both before and after his discharge to make him cognizant of the potentialities of the cripple. Free use should be made of technical and other schools while the last stages of the restorative treatment are being carried out in out-patient institutes; and when the man is ready, employment bureaus should lend their aid in securing the proper work.—A. O. W.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

AGAINST ROCKEFELLERISM

The accumulation of capital is to many an inherent reason for reproach and condemnation. In fairness to those who possess millions, scrutiny should be given as to the use made of their wealth. The development of our economic system has fully indicated the necessity and value of large financial units for carrying on vast enterprises. Today we are learning to talk in terms of billions as the generation that has passed was wont to speak of millions; and hundred thousands were rare fortunes two generations ago.

Judged from the point of view of a definite policy for the expenditure of funds, the Rockefeller Foundation affords an illustrious example. A fund of \$120,000,000 affords an income, which during the past year was inadequate to pay expenses of the various enterprises fostered or originated and developed under its auspices. The aim of those in charge of this large fund has been to demonstrate the value of specific undertakings and then to turn them over for further support to the communities to be benefited by their continuance. This, of course, does not pertain to the special war activities carried on thruout the world for the purpose of relieving the destitute and suffering, altho some particular problems are being attacked for the purpose of demonstrating to governments their value in the protection or reconstruction of communities against the ravages of disease or the disabling effects of war wounds. A large measure of the program is designed to improve the public health, to preserve human life, to foster the welfare of the race, and make possible a happier and a healthier world after the trumpets of war will have been stilled.

The Rockefeller Institute for Medical Research has had added to it a portable military base hospital, itself a model, in which demonstrations are being made of the value of the Carrel-Dakin methods of caring for wounds and injuries. At the same institution, medical officers of the Army and Navy are receiving instruction in war surgery, bacteriology, and the technic of the treatment of pneumonia, meningitis, and gas-gangrene.

The large part that mental hygiene is playing in the present war has been developed thru the survey made by Major Salmon whose studies of conditions in the belligerent countries were made possible by money supplied by the Foundation. The survey of the tuberculosis menace in France, was made by

Dr. Herman Biggs under the direction of the International Health Board of the Rockefeller Foundation. As a result of this investigation, France now has an opportunity of studying a highly organized method of dispensary service, methods of popular education concerning tuberculosis, and the establishment of centers for the training of workers and visiting nurses for the care and instruction of the tuberculous. Tuberculosis control, therefore, is another feature of the public health work being undertaken under these auspices.

The institution of a School of Hygiene and Public Health as part of Johns Hopkins University, marks a step in advance in the educational work of this country, and in all likelihood it will become a national center for research and teaching along lines generally described as belonging to preventive medicine.

The campaigns throught the world against hook-worm, malaria and yellow-fever, involving improved public health administration, more adequate legislation, and carefully organized public health education, have not merely added to our knowledge concerning these diseases and the methods of their control, but has added to the efficiency of the communities in which such work was undertaken and has made available a higher percentage of the vital resources of those countries.

The work of Dr. Grenfell in Labrador may have been the basis of an experiment in supplying a mobile dispensary unit in the form of a hospital ship for meeting the needs of the natives of the Philippine Islands and the Sulu Archipelago. A floating dispensary of this character suggests the possibility of the development of a series of mobile automobile dispensaries operating in rural communities from a fixed base hospital, as their center. Undoubtedly the Rockefeller Foundation will undertake this further experiment, following out their plan of assisting new but worthy enterprises upon the agreement that if proven to be a success, the expenses thereafter will be met by the authorities originally assisted.

When the future history of the great republic of China is written, the story of its medical development will be a monument to the enthusiasm and devotion of medical missionaries and to the vision of the China Medical Board acting for the Rockefeller Foundation. Its initiative has given rise to the Pekin Union Medical College with its pre-medical school, laboratories, hospital wards, dispensary service, together with various other institutes for which financial aid and encouragement have been provided.

This brief and incomplete résumé of the public

health activities of the Rockefeller Foundation attests a scientific interest in medical problems and public health, and should promote a better understanding of the possibilities of accomplishment thru the intelligent use of large capital. When one appreciates the vast expenditures involved in war and recognizes in how far the baneful effects are offset by constructive programs one is filled with a sense of appreciation of, and enthusiasm for, the efforts and results that have attended the spending of some of Mr. Rockefeller's accumulations. Without entering into discussion as to the economic principles involved in the accumulation of large fortunes, it is patent that the general benefit to the world thru scientific and sane spending may offset much of the misunderstanding and abuse which is visited upon those in the multi-millionaire class.

Medicine and surgery owe much to the beneficent contributions of the wealthy. While the scientific accomplishments redound to the credit of the carefulness, accuracy, perseverance, and vision of the medical and surgical fraternity, it cannot be forgotten that their results frequently were made possible by philanthropists, blessed with financial means and not lacking in public spirit and public conscience.

Book Reviews

Preventive Medicine and Hygiene. MILTON J. ROSENAU, Professor of Preventive Medicine and Hygiene. Harvard; Director of the School of Health Officers of Harvard University and the Massachusetts Institute of Technology. Formerly director of the Hygienic Laboratory, U. S. Public Health Service. *Third Edition*, containing a special section on Military Hygiene. D. APPLETON & COMPANY, 1917.

This volume represents a new and welcome revision of Rosenau's well known work. The book comprises thirteen sections each a fairly complete symposium on a branch of sanitation and hygiene. The last section is a timely contribution to war hygiene containing valuable information on many subjects such as the recruiting of soldiers, control of diseases and the choice and sanitation of camps and barracks.

Section one considers the prevention of communicable diseases. There are six subdivisions, the last one by Thomas W. Salmon on Mental Hygiene. The others on diseases grouped according to their specific prophylaxis, or mode of communicability. Section two deals with immunity, heredity, and eugenics. The immune responses of disease are explained according to the best accepted theories and experimental data. A chapter on anaphylaxis is quite comprehensive yet lucid in its detailed description and definitions.

Section three takes up food, its uses, classification, decomposition, adulteration, preparation and preservation. The animal and plant foods are considered in separate chapters. In the same manner a section is devoted to the air; another to the soil; still another to the water. Section seven is on sewage disposal and is written by George C. Whipple; section eight on refuse disposal by the same author. John W. Trask wrote a section on vital statistics.

The final sections deal with industrial and occupational diseases, schools and disinfection.

Throughout the book the author displays a wide knowledge systematized, made valuable by illuminating experiments and experiences. The volume is full of information, invaluable to the sanitarian and not without profit for the practicing doctor. The charts and illustrations are clear, the text well printed.

Diagnostic and Therapeutic Technic. A Manual of Practical Procedures Employed in Diagnosis and Treatment. ALBERT S. MORROW, A.B., M.D., Clinical Professor of Surgery in the New York Polytechnic; Attending Surgeon to the Workhouse Hospital, and to the Central and Neurological Hospital. 834 pages with 860 illustrations, mostly original. *Second Edition*. W. B. SAUNDERS COMPANY, 1917.

In the book Morrow plans to present first, a general consideration of diagnostic and therapeutic measures and, second, to explain and describe the many and various procedures employed in the diagnosis and treatment of diseases affecting the special organs and regions of the body. Separate chapters are devoted to the measures used for the ear, the nose, larynx and trachea, stomach, and genito-urinary system. Exploratory punctures receive special descriptions, also methods of infusion and transfusion. In the latter instance no mention is made of the recent advances in direct transfusion as advocated by Lindeman and Unger, or the transfusion of cetrated blood as suggested and demonstrated by Lewisohn and Weil. The value of iso-agglutinins and iso-hemolysis with their special significance in the selection of transfusion donors is not sufficiently stressed.

In the chapters given over to genito-urinary procedures there are not included the neoseuthal renal test meal, a proper interpretation of the chemical findings in the blood of non-protein nitrogenous products nor any indication of the value of the ambar coefficient as simplified by MacLean, the important contributions of Rehfus to gastric diagnosis are not included; also artificial pneumothorax as proposed and used by Forlanini and Murphy has found no place in this volume.

Yet the book contains innumerable methods and procedures of tried usefulness. These are clearly illustrated and described simply. The surgical technic is especially well presented.

Laboratory Methods of the United States Army. Compiled by the DIVISION OF INFECTIOUS DISEASES AND LABORATORIES, Office of the Surgeon-General, War Department, Washington, D. C. Illustrated. LEA & FEBIGER, 1918. Price, \$1.50.

This manual is not a text book. It is prepared for those who are familiar with bacteriology and its practical uses and applications. It is designed to be a ready, convenient compendium for laboratory workers. It contains, therefore, in most compact form, accounts, information and data on standard solutions, staining fluids, media, etc., also tables for reference.

The newest accepted methods are included. The last 100 pages are devoted to special bacteriological methods vs. typhoid carriers' problem, Schick reactions, cultural groupings of pneumococci, etc., and to sanitary examinations of milk, water and sewage.

Surgical Clinics of Chicago. February, 1918. *Volume 2, No. 1*, with 73 illustration. Philadelphia and London. W. B. SAUNDERS COMPANY, 1918.

This volume contains a large number of timely articles all written in their usual excellent manner and well illustrated; deserving of special mention are those of Major Speed, Dr. Dyas and Dr. Parker. The last takes up the non-operative therapeutic measures which are employed in the commoner orthopedic conditions. A case, in which the method of reconstructing the common duct is shown, is described by Dr. Bevan.

Progress in Surgery

A Résumé of Recent Literature.

A Further Study of the Use of Chloroform in Labor. J. H. HILL, *American Journal of Obstetrics*, February, 1918.

Hill contends that the delayed pernicious effects from chloroform have been noted chiefly in surgical cases and those obstetric deliveries where prolonged operative measures were necessary. In such case ether is preferable. But from chloroform used to the point of obstetric analgesia only, Hill maintains there can be no delayed visceral poisoning. Too little altogether is thus given for organic changes to take place. Hill administers the chloroform in such fashion that the first few pains are entirely obviated by it, then gives less and depends on suggestion to keep the patient in a quiet state of mind. The psychic effect is made possible and accentuated by a few drops of chloroform judiciously given.

Large Pedunculated Cavernous Angioma of the Liver Reaching Down into the Pelvis and Causing Obstetric Difficulty, I. C. RUBIN, *American Journal of Obstetrics*, February, 1918.

Rubin reports a case of a giant size tumor of the liver which was palpable by vaginal examination and which was operated on the diagnosis of an ovarian tumor. It proved to be a huge cavernous hemangioma of the liver and weighed four pounds and twelve ounces, appearing to be much larger than the liver itself from which it sprang by a short, thick pedicle. The tumor was removed with practically no bleeding taking place and the patient made an uneventful recovery.

The further interest in the report is the circumstance that in the last confinement of the patient, who was thirty-three years old, her abdomen had assumed such large proportion that she was unable to move about, and had sharp pains in the right hypochondrium. She was regarded as carrying twins. Induction of premature labor was decided upon because it was deemed the child was too large to be born eventually per viam naturalis. The patient had previously been delivered of four twins and had thirteen children altogether. It was only after the last previous child-birth that the patient noticed the presence of this tumor. This gradually became larger, so that at the seventh month of pregnancy her abdomen seemed much larger than on previous occasions when she actually bore twins.

The physical examination elicited one point which the author points out could have established the proper diagnosis in the case he reports, if properly stressed; namely dullness over the tumor area from the pelvis up to the liver area with which it was continuous. But the rarity of this condition in contrast to the more common complication of ovarian tumors in pregnancy will probably in similar occasions favor the diagnosis of the latter. As for the presence of an angioma of this size, laparotomy alone will be the determining factor.

Uncinariasis in Pregnancy, G. FRASER WILSON, *American Journal of Obstetrics*, February, 1918.

Wilson calls attention to a form of toxemia in pregnancy occurring in women of the rural districts, in mill and factory workers and those living in settlements. In many a history of "ground itch" may be elicited. The patient is usually pale, cadaverous, and sallow of complexion; looks not unlike a person suffering from chronic malaria with edema, flashes before the eyes and dizziness. Examination of the washed stools will reveal in these cases either the ova or the worms or both. A marked eosinophilia is always present. The therapy consists in fifteen drops of chenopodium oil repeated in an hour and repeated every week for three or four weeks and followed each time by a laxative, preferably castor oil. The oil of chenopodium is best given in capsules and is superior to thymol because of its freedom from toxic symptoms. Attention to the general health is also very important.

A Case of Gangrene of Uterine Fibroid Following Parturition; Panhysterectomy, RALPH WALDO, *American Journal of Obstetrics*, February, 1918.

Waldo removed a uterus which was the seat of a sloughing, gangrenous submucous fibroid in a patient 24 years old, some four days after the delivery of a premature child. There was some antepartum temperature which was higher after delivery. The submucous fibroid was felt by the examining finger. The patient recovered after going through an attack of lobar pneumonia and an infection of the abdominal wound. This took place in spite of all precautions being taken to prevent secondary infections. Waldo recommends panhysterectomy early in such cases in order to prevent peritonitis.

The Cholesterol Content of the Blood in Gall-Stone Disease, STANLEY P. REIMANN and J. A. H. MAGOUN, *Surgery, Gynecology and Obstetrics*, March, 1918.

The authors have made cholesterol determinations in the blood of sixty patients with histories relating to upper abdominal lesions and contrast their findings with those of the subsequent laparotomies. It is interesting in view of the recent reports in the literature emphasizing the diagnostic value of cholesterinaemia in gall-stone disease, to note Reimann and Magoun's conclusion that a hypercholesterinaemia has no significance in the differential diagnosis of cholelithiasis. A hypercholesterinaemia is not constantly present in cholelithiasis, while many other conditions may affect the quantity of cholesterol in the blood.

Results Obtained by Tonsillectomy in the Treatment of Systemic Disease, DANIEL W. LAYMAN, M.D., Indianapolis, Ind., *The Laryngoscope*, February, 1918.

Layman advocates the early removal of the tonsils as a prophylactic measure. He sent a questionnaire to a number of laryngologists and internists and the consensus of opinion bore out his contentions. He quotes from La Fetta that children whose tonsils have been removed are much less susceptible to respiratory and gastrointestinal disease. He has noted no cases of maldevelopment from early tonsillar removal and measles; scarlet fever and whooping cough in these children take a milder course.

The relationship of focal infections to systematic disease was first pointed out by laryngologists in connection with the tonsils. He tabulates, from his questionnaire, a list of very favorable results from tonsil removal in arthritic and cardiovascular conditions. Thyroid infection seems to be very favorably influenced by tonsillectomy. Some men of experience in thyroid work, notably Crile and Halstead and the Mayos, operate upon the thyroid first and later remove the tonsils to prevent a recurrence of hyperthyroidism.

Hookworm Disease, S. T. DARLING, M. A. BARBER, and H. P. HACKER, New York, *Journal of the American Medical Association*, February 23, 1918.

An elaborate paper based on the work of the Rockefeller Foundation in the Malay Peninsula, Java and Fiji Archipelago, covering two and one-half years, is presented. The principal point is the comparative merits of oil of chenopodium and thymol in the treatment of the disease. Their methods of obtaining, counting and classifying the worms, and the relative efficiency of various drugs in expelling them and methods of preparation of the patients and administration of the treatment are given in considerable detail, and they find that oil of chenopodium is by far the most efficient. What they call the half maximum dose (0.5 c.c. three times, or 1.5 c.c.) of oil of chenopodium is the preferable routine treatment. It does not have the toxic effects of the full dose, and two treatments have the very satisfactory result of removing 99 per cent. of the worms present. It has the additional advantage of more uniform action, and is less unpleasant to the taste than thymol. Thymol has an advantage over this half dose of oil of chenopodium, in that the 90 grain dosage produces a better result when single treatments are compared. This disappears, however, when two half doses of oil of chenopodium are used, and a dose of 90 grains used indiscriminately would lead to serious results.

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA & ANALGESIA

[American Journal of Anesthesia and Analgesia]

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July,

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BEHIND THE LINES OF VERDUN*

ALONZO MILTON NODINE, D.D.S.

Oral Surgeon and Dental Consultant, French Hospital, New York. Assistant Dental Resident, New York Throat, Nose and Lung Hospital. Late Oral and Dental Surgeon The Hôpital Française de New York No. 32 bis, Fassy par Veron (Yonne) France. Oral and Dental Surgeon New York Nose and Throat Hospital.

NEW YORK CITY, N. Y.

Step up to the ticket office, buy your passage, walk up the gang plank, and you are off to France. Nothing like it! If you think you "just want to run over to Paris, and then motor out to the front line trenches," well—you'll just not go; that's all there is to it. You'll stay right in Cohoes. The belligerents are not engaged in this terrible conflict to furnish a spectacle for the idly curious, but for certain ideals and ideas which they hold dearer than life.

If you want to go to France during the war, you must select your father and mother with great care. You must pick out a father and mother who were born either in the United States or in one of the allied countries. You may argue and protest and implore that it wasn't your fault, that you couldn't help it—but the French look at it in a different way, and they are in the majority at the other end of the line. In other language, you might get your passport, and you might possibly (hardly probably) get your passport visé by the French consul in New York, but when you landed in France you would be sent back!

To secure a passport a request is made for application blanks to Washington or to the passport office in New York. Four application blanks are needed with five photographs—one for your passport and one for each application with a letter stating for what and where you are going. You must make application for your passport at least seven days before you sail—giving the name of the steamer, day of sailing, and the port to and from which it sails. If the requirements in the passport are met to the satisfaction of the Department of State, you will receive your passport at the passport office in New York. You must have either a copy of your birth certificate or two persons who will swear that you were born when and where you declared you were, and they must also swear that you have made no false statements in any part of your passport.

NEEDED AT THE HOSPITAL FOR VERDUN.

About a year ago I planned to give my services as Oral and Dental Surgeon to a large hospital just

outside of Paris. They were not accepted at that time, but at a later period the opportunity was presented to go to this hospital, or to the Hôpital No. 32 bis., which is located fifty miles from Verdun and is the depot for Verdun to which the wounded are brought by sanitary trains from the dressing station immediately back of the lines. I chose Hôpital No. 32 bis. An oral and dental surgeon surgeon was needed; in fact the hospital would not have been so long without one had the head surgeons appreciated the need and the benefits to be derived from such service. Cases were sent from this to to other centres because there was no oral surgeon here to assist the general surgeons in the repair of the maxillary and facial cases. The need for this service was felt by some of the surgeons and nurses, and repeatedly brought to the attention of those in charge. The need was apparent to me and the benefit that would result from the organization of an oral and dental surgical service appeared so great that I offered my services and to pay my traveling expenses to and from the hospital. My services were accepted on this condition, but later the hospital decided to pay my expenses.

At the request of the president of the French Hospital, Mr. Jouvaud, I bought a very good dental equipment. It consisted of a hydraulic chair, electric all cord engine, bracket table and such supplies and materials as would be needed for immediate use. In addition to these were my oral surgical instruments, dental instruments, one hundred and twenty-five yards of gauze (folded into small gauze wipes of a convenient size) novocain (sufficient to make about 3,000 c. c. of solution) orthoform, sutures, etc.

The two or three weeks prior to my sailing were crowded with work of a professional and private character and that incident to the organization of this department. The equipment and supplies were gone over several times to make certain that no necessary or essential thing had been forgotten.

ON THE STEAMER

On Saturday, June 24th, one hour before sailing, I removed the stitches from a recent operation. My patient showed no resentment and very kindly motored me to the steamer.

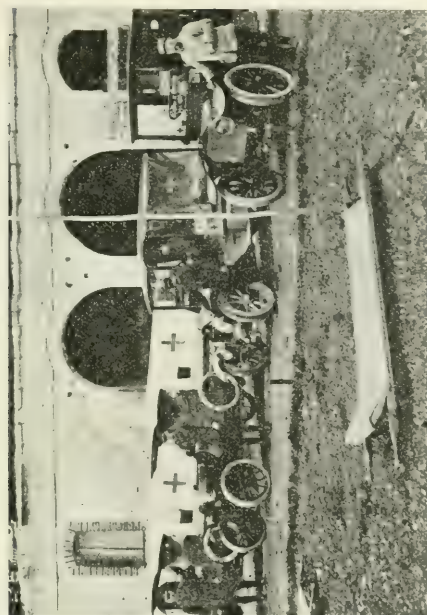
On the pier I was introduced to Mr. Emile Rey, administrator of the hospital in Paris, and to my companions of many months, Dr. Alexander Bruno, of Roosevelt Hospital, and a Rumanian artillery officer, the two latter shared my stateroom. I carried letters of introduction to a number of celebrated surgeons in France.

*Read during the Joint Meeting of the Interstate Association of Associations and the Mississippi Valley Medical Association, St. Louis, Mo., 1917. Reprinted by permission of the Dental Forum.



HOSPITAL STAFF (READ LEFT TO RIGHT)

1. Dr. John Irwin, Assistant Medical Chief; 2. Miss Demming, New York Hospital; 3. Mr. Roy, Administrator of Hospital; 4. Dr. T. M. Savage, French Hospital, N. Y.; 5. The writer; 6. Dr. Eugene H. Pool, Medical Chief, Attending Surgeon, New York Hospital; 7. Mr. Chapel, Administrator of Hospital; 8. Sister Elmore; 9. Dr. Bruns, Roosevelt Hospital, New York.



Ambulances ready to go for wounded.



French soldiers mobilized to put the hospital in condition to receive wounded.



Arrival of wounded from the front ready to be taken to the hospital.



Hospital No. 32 bis. Formerly the Château.



Arrival of wounded from the train.

About three o'clock the steamer *Lafayette's* lines were cast off and we were on our way to France. One day on shipboard followed another with delightful weather, beautiful skies and fine nights. No submarine or other hostile craft was met. Two interesting features of the voyage were the life boat and life belt drill in which all took part. They had an added interest because of the fact that any moment we might need the knowledge. Each passenger was assigned to a certain boat on a certain deck in order to familiarize all with their proper station should any accident occur. We tried on life belts so that we should know how to get into them if necessary.

About two days from Bordeaux, the "76" was uncovered. A target in representation of a submarine periscope was dropped astern and several shots were aimed at it.

The morning of the night that we arrived at Bordeaux we were met by one or two French torpedo boats. These accompanied us to the river's mouth. The sail up the river was most charming and interesting. The beauty of the scenery was enlivened by the picturesqueness of the red-tiled houses and the tall graceful poplar trees. Along the river bank or farther back on farms we could see German prisoners working. We could also see French battleships that had been in the Dardanelles undergoing repairs.

About eight o'clock at night we docked at Bordeaux. In the dining salon of the steamer passport examiners assembled, ten or twelve in number. We were admitted one by one. Each person and each passport was closely scrutinized and examined by the whole number as they sat on either side of a large oblong table. Finally we were through and our baggage was examined by the customs.

EN ROUTE TO PARIS

At eight o'clock in the morning we left for Paris

on the train. The journey through southern France was very interesting. From the car windows we could see old and beautiful chateaux, vineyards and farms, which gave evidence of the wealth and thrift of the French people. We arrived in Paris about 7 o'clock at night. In a taxi we passed the Madeleine, where, of mornings, flower women gather to sell wonderful bunches of beautiful violets and flowers of all kinds, then down the Boulevard de la Madeleine to the Place de la Concorde, where stand the two statues of Alsace and Lorraine, which prior to the war were draped in black, but now were draped in wreaths of flowers. In the distance we could see the Eiffel Tower and on our right hand was the beginning of the Champs Elysées, then down the Rue de Rivoli, the famous street of delightful arcades, buildings and shops, with the gardens of the Tuilleries on one side and, then to the Hotel Continental. We were assigned to beautiful rooms with bath rooms which were marvels of completeness.

About ten o'clock we went out to see Paris at night. Down past the Place Vendôme where the Palace of Justice is a neighbor of the Ritz Hotel. Here a few military motor cars were waiting for some late decisions of officers. We then walked down to the Boulevard Capucines. The lights were shaded, a few people were on the streets, taxis seemed plentiful. Every café we entered we were met with: "It is too late, we must close at ten thirty."

Strange it seemed indeed for the Paris of gaiety and life to be dark and quiet. In the daytime on the streets of Paris one would see three men out of five in uniform, and four women out of five in mourning. British officers, Australians, Canadians, South Africans, Russians and Belgians were seen almost as frequently as the officers of France. There seemed no depression, or sadness, except the

sadness which so great a number of people in black would bring. Here and there about the city one could see a business with a sign of mobilization on the door, but there were not so many as one would naturally anticipate.

Friday night we received our uniforms and Saturday morning we left for Passy. We secured the military rates because of our uniform and arrived at Sens about 9:45. In the train we noticed the preponderance of military uniform over civilians. Before the approaches to every railroad bridge were sentries, also at all railway stations.

Dr. McLaren, one of the surgeons at the hospital, met us with a car. As we motored through this medieval town of Sens it seemed very strange and delightful. Shops, houses, streets, riverside, everything was quaint and odd. This is the depot that supplies Verdun. In the town we noticed the passing and repassing of troops to and from the front. On the outskirts of the town, we were halted by a sentry but were given permission to pass when we told who we were.

The countryside from Sens to Passy is a beautiful farming district, the roads are straight, hard and smooth and bordered with graceful poplar trees. We passed through two or three French villages which suggested paintings I had seen. The countryside differs from the American countryside by reason of the fact that we saw no tumbled down buildings, few or no fences, no litter, no cans, newspapers, or wood strewn about the farmhouses or along the roadside; everything seemed to be picked up and clean.

About one mile away we could see the Chateau, which is surrounded by a high flint wall. We entered the grounds through a big gate and then across the drawbridge and through the drawbridge gate into the quadrangle of buildings, which, in times past, were coach houses, stables, farmhouses, cattle stalls and retainers' quarters. The car stopped in front of the Chateau and we were at the Hospital, or as it is known to the French, Hôpital No. 32 biz., "the finest organization," Major Ford, U. S. A., wrote he "had seen in France."

The property consists of eighty acres of beautiful park land and is entirely surrounded by a high flint wall. This wall is pierced at four or five places with gates. Some years prior to the war it was bought by the French Government; later used by refugees from invaded districts.

Before the declaration of war there was practically no such thing as a dental service for the French army. The medical service of the army was neither well organized nor well prepared. What

organization the French army had was pitifully inadequate to take care of the great number wounded in the opening battles of the war. This was conspicuously so in regard to first aid and the means to transport the wounded to the dressing stations and base hospitals.

But the French military authorities had ready a plan, drawn up in detail, for the complete organization of such a service. This plan was put into operation as soon as possible and now the Service de Sante is a model of efficiency.

An American surgeon working in a French military hospital but a short time said to me: "There are many things the French do, which to me, at first, seemed to be done for no logical reason—but the longer I'm here the more firmly I become convinced that the French know exactly what they are doing, and are doing it well."

The claims of dentists, based on incontestable testimony, for the institution of an organized dental service for the Army were rejected by the military authorities before the war. They denied not only the usefulness of such a service, but declared that dentists could be only an annoyance and an incumbrance.

When the French mobilized, the dentists were mobilized not into the medical or a dental service but into the various branches of the French army with absolutely no provision for the utilization of their services in a professional way.

The dentists and the dental students were withdrawn from hospitals and clinics and there was practically no dental service for even the civil population.

But soon such men as Godon, Roy, Vian, Martinier, d'Argent, Villain and Bioux, in Paris, Pont in Lyon, and Cavalie in Bordeaux organized and instituted, with the help of many other dentists and other organizations, a dental service for the wounded, for those who had been rejected because of the inadequacy of their dental organs and for those already in the military service. Now there are forty centres in the chief cities of France for the treatment, repair and restoration of dental, maxillary and facial defects and wounds. There is a corps of military dentists and a corps of naval dental surgeons.

IS THE DENTAL SERVICE NEEDED?

Dr. G. Villain, general secretary of the Dental College of Paris, from a personal observation at his own depot, estimated that there were about two full army corps disqualified because of the condition of their teeth. If the teeth of the men are so bad before they enter the army, this condition is mag-

and they have been in the army behind Verdun for some time. And after they have been wounded their condition is still worse.

It was stated that there were forty centres in the chief cities of France for the treatment, restoration and repair of dental, maxillary and facial defects and wounds. There are also mobilized dental surgeons at the various depots throughout France. There is also one dental automobile attached to each Army Corps. These are cabinet laboratories perfectly equipped and capable of following the troops wherever required.

There are about eight thousand hospitals of one kind or another throughout France. How many of these have dental and oral surgeons in their service I do not know, but the percentage is very small. There are not enough dentists in France to properly attend to the civil population. The needs of the army can only be partly met—and the demands of the hospitals are met at all only in isolated cases. What is the condition of the teeth of the wounded when they arrive at the hospitals? From my observation of the men when they arrive from Verdun, practically all need dental attention of some kind. Nineteen men out of twenty need fillings. All need their teeth scaled and cleaned. Fifty per cent. have abscesses of one kind or another, and about twenty per cent. need plates, to replace lost teeth.

IGG'S DISEASE NOT PREVALENT

The number of men who have Riggs' disease is very small and those who do have it to any marked degree are men who come from the large cities. The peasants are comparatively free from it. This, I believe, to be largely due to coarse food and the simple life the peasants lead. The institution of an oral and dental surgical service in a hospital accomplishes many things. Under good conditions it may improve the facial appearance of men who have borne the stress and strain of war—those men who have been shattered and battered. Anything that will improve their appearance may be a gift of new hope. They may return to their families and their friends with added confidence and a certain pride that their teeth are at least presentable. How much this means to them only those who have served in these hospitals may tell. They will allow you to do almost anything to their teeth if you assure them that those you remove or those that have been lost will be replaced.

Men who need all the nutrition they can get to assist in building up their resistance, to assist them in overcoming the drain of the terrible wounds, all of which are infected; to help restore nerves shat-

tered by the terrible artillery fire and by the carnage of an attack, such men need a good masticating apparatus. They cannot chew properly with missing teeth, with decayed teeth, and they cannot chew properly with sore and aching teeth.

It is realized by hospital surgeons that an efficient masticating apparatus is a most important factor in the recovery of the wounded.

ABSCESSSED TEETH A SOURCE OF POISON

Again, in another way, these diseased and abscessed teeth are a source of poison. Hidden abscesses on dead teeth furnish micro-organisms and toxins that neutralize the constructive forces of the body. They delay, postpone and overcome efforts of the system to combat the infections that have invaded the body, and retard the healing processes.

The constant ingestion of food mixed with pus and the discharges of diseased teeth and gums affect the digestion and add another and an internal source of infection for the system to overcome.

The pain and distress of these aching teeth plus that of the constant agony of terribly lacerated wounds, of infected and shattered limbs and joints, produce such a strain that even iron constitutions weaken under their influence.

Consider for a moment the annoyance, the discomfort and irritation that one diseased tooth may cause in an individual otherwise perfectly healthy. Multiply this several times, then add to it the agony of a body shattered by shell fire, shrapnel fire, rifle fire, liquid fire, asphyxiating gas, bayonet wounds and grenades. Add this to nerves that have been shattered by thunderous and constant roar of heavy calibre guns, the piercing shrieks of light artillery, the vicious grind of machine guns, the horrible boom of trench mortars and the uncanny cries of aerial torpedoes. How man can survive all this is truly wonderful.

Relieve, reduce or take away any pain, any discomfort, and irritation and the rest may be borne with greater ease and greater fortitude. And nothing will contribute so much to this relief as the removal of or stopping of the pain of aching and diseased teeth, no personal sacrifice is too great to contribute to alleviation of this vast amount of suffering.

Some men may be placed in such physical condition that they will be enabled to return to their regiments. Many men are now unable to return on account of the condition of their teeth. Other men may be placed in such condition that they may return to their life-work or be re-educated to a work for which their shattered bodies may be most easily trained.

In the reconstruction of jaws and faces the oral and dental surgeon plays an important part co-operating with the general surgeon. He it is who makes possible the work of the surgeons in these cases.

For the dental profession, it seems to me and it is apparent to all, that the description of an organized purpose is valuable not only at times of war but in times of peace.

The experience and lesson of the European countries now at war should be, maybe, an opportunity for us to organize our disorganized purpose, to bring order out of the chaotic condition in which our efforts are now. This is quite as valuable as the experience to be gained from the execution of our professional efforts. It would be extraordinary if there should not come out of the union of thought and purposes, to accomplish the most good in our special field, certain standardization of operation, treatment and equipment, that would prove most useful in our civil practice.

The first patient was Pasquereau, a private, wounded at Verdun. He had a compound fracture of the humerus and radius, and wounds in the chest. The compound fracture was badly infected. It suppurated continuously due to infected foreign material carried into the depth of the wound. There were several large rubber tube drains inserted into his arm. The pathological process had stimulated the bone producing cells so that the elbow joint was about twice the size of normal and was completely ankylosed.

An examination of his mouth disclosed a large suppurating abscess in the region of the upper first right molar with broken down teeth on either side. In the lower jaw the three molars were beyond repair. An X-ray examination showed the upper first molar, upper second molar and first and second bicuspid infected.

The following day under novocain the three lower molars were extracted, the sockets curetted of any granulomas and the process smoothed with bone-cutting forceps and packed with iodoform gauze. This was changed every day. Owing to his poor physical condition and the extreme pain of his wounds most of the dressings were changed while he was in bed. At a later date his upper molars and bicuspid were removed and his teeth scaled and polished. His physical condition improved so rapidly after this that he was able to be sent south to a convalescent hospital.

My second patient was Oswald Holtz, son of General Holtz, wounded in the battle of Champagne. The terrible severity of this attack shattered the nerves of many who took part, his included. He

was wounded in both legs, right ankle and feet. These wounds would almost completely heal, then they would open up until several small spicules of bone worked out.

An examination of his mouth showed a large abscess extending from the first bicuspid to the second molar. It was as large as an egg and bulged down half of the roof of his palate. This was lanced. A large amount of pus was discharged and the wound packed with iodoform gauze.

The next day under conductive anesthesia the upper molar was removed. The palatal root was broken and in using an elevator the tip of the root was pushed into the maxillary sinus. The following day under ether the opening into the maxillary sinus was enlarged with a large gauze and then irrigated with normal saline solution. The maxillary sinus was packed with one-inch iodoform gauze. The upper first bicuspid was removed and lower second bicuspid and first molar were removed.

This patient's nerves were so shattered that only by the aid of an anesthetic, such as ethyl chlorid, could the dressings be changed.

The maxillary sinus was irrigated every other day, the opening painted with iodine and packed. The opening gradually closed without any suppuration.

Le Blanc, wounded at Verdun, had penetrated wound of the face passing from a point about three-quarters of an inch in front of the maxillary sinus; then under the floor of the orbit into the great wing of the sphenoid.

This produced a paralysis of the sensory nerves of the right eye and ankylosis of the temporo-maxillary articulation.

An examination of his mouth revealed the upper first bicuspid and upper left canine and first bicuspid abscessed. These were extracted under novocain, the sockets curetted, the process clipped with bone-cutting forceps and then packed with iodoform gauze.

After these had healed the first step in reducing the ankylosis was made. Rubber tubing was placed between the upper and lower incisors, canines and bicuspid.

In twenty-four hours the jaws were opened about three-eighths of an inch, with considerable pain at the left temporo-mandibular, the articulation and the muscles of that region. Modelling composition which hardened quickly was placed between the incisors, canines and molars to relieve the soreness caused by the rubber tubing. In three or four days the modelling composition was inserted between the front teeth and base plate gutta percha with cement



Dr. Savage and the author resetting a tooth.



Staff of Dr. Blake's Hospital



The writer irrigating elbow wound of St. Paul.



The writer packing sockets of teeth after extraction and curettement.

was packed tightly between the upper and lower molars.

Later there was enough space between the molars to insert rubber tubing. This process was continued until, when I left the hospital he could open his mouth about three-quarters of an inch and could masticate his food with some degree of comfort. The fact that the left side was not ankylosed interfered with the opening of the right side, because no matter how much space was obtained on the right hand side and left hand side would open up still more and relieve the pressure on the right hand side.

Had the suppuration in this deep wound stopped, I would have preferred an operation to close the large hole under his orbit. But any attempt to have performed such an operation would have confined the infection with almost certain production of a meningitis.

Duquesne was wounded at Verdun. He had a compound fracture of the lower right leg just above the ankle. The cellular tissue of the lower leg was badly infected with considerable swelling of the thigh.

When I was called to see him in the reception ward he was in bed. He had been given morphin for several nights for pain from a large alveolar abscess on the upper right side in the region of the first molar and bicuspid. The whole right side seemed involved. The infection extended up to the eye and nose and to the third molar. He was the color of lead. Under ethyl chlorid this abscess was lanced with a discharge of a considerable amount of pus. The wound was packed with iodoform gauze.

Six days later while still in bed, under novocain, the three broken molars and two bicuspid on the right side were removed, the sockets thoroughly curetted, the alveolus trimmed and the wound packed with orthoform and iodoform gauze.

Several days later the lower right broken down molars and second bicuspid, the upper left first and second bicuspid and the lower left first molar were extracted. The sockets of these were curetted, the alveolus trimmed and the wounds packed with iodoform and orthoform gauze.

After these wounds had healed there still remained some teeth to be filled, scaled and polished. He was carried upstairs on a stretcher. These teeth were filled and his teeth were scaled and polished.

Impressions of his upper and lower jaws were taken, and partial plates made. These were inserted a short time before he was transferred to a convalescent hospital in the south of France. The physical condition of this patient improved remark-

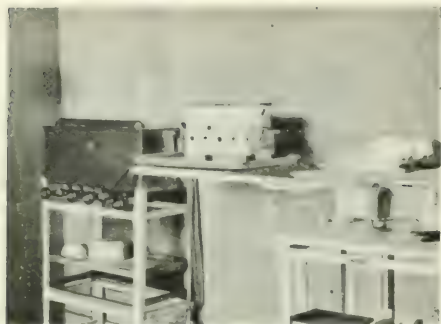
ably after the removal of the infected teeth, and a curettement of the sockets.

Peep, the pet of the hospital, wounded at Verdun in left loin below the twelfth rib, and in the right loin the bullet affected the spinal cord so that he was paralyzed below the waist. While in bed we gave him a mandibular injection to remove the lower left first and second molars. This necessitated considerable bone cutting with chisels and the roots were removed with elevators. Owing to the difficulty of working on the patient in bed, it took about an hour to remove the roots, the sockets were curetted and trimmed with bone-cutting forceps and then packed with iodoform gauze. This was one of the most difficult cases of extraction which I had while in the hospital.

Cherri was wounded in the head at Verdun, while in charge of the captive balloon. He was sent to the hospital from Sens for X-ray examination and examination of his mouth and teeth. The X-ray revealed badly broken down second bicuspid, first and second molars on the upper left side. A tuberosity and infraorbital injection were made and these teeth extracted. In curetting the sockets of these teeth an opening was discovered into the maxillary sinus in the region of the first molar. This opening was enlarged and the maxillary sinus curetted. A large amount of broken down and disorganized material was removed. The sinus was thoroughly irrigated, and painted with iodine. This was packed with over twenty-four inches of one-inch iodoform gauze. This was changed every other day until he left the hospital.

Marchand Emile, a fine big fellow, was wounded at Verdun, August 22, 1916, and reached the hospital September 10th. He had an enormous lacerated wound of the right forearm. This wound extended almost the full distance of the arm from the elbow to the shoulder. He also had a fracture of the ulna with some paralysis of the hand and fingers. An examination of his mouth showed a great many teeth in the upper and lower jaws on both sides broken down and decayed. An X-ray examination revealed large areas of destruction around the apices of several teeth. These areas were as large as ten-cent pieces.

An infraorbital injection of novocain was given him on the right side and also infiltration. The first molar, first bicuspid, the lateral and central were extracted and the sockets of the molar and the centrals were curetted and packed. A mandibular injection was given on the right side. The first, second and third lower molars, and first and second bicuspid were extracted. The septisms between



Sterilizing and novocain outlet

these teeth were destroyed, and granulomas as large as cranberries were curetted out. The alveolar process was curetted and smoothed with bone-cutting forceps and the overhanging gum trimmed away with curved scissors. These large wounds were then flushed out with normal saline solution, painted with iodine and packed with iodoform gauze impregnated with orthoform. The packing was changed every other day until the wounds healed. Later the upper left bicuspid and third molar were removed after giving an infraorbital injection, and the lower first molar was removed under a mandibular injection. The upper third molar was abscessed. The socket was curetted and packed.

When these wounds had healed, which takes place rapidly when the process has been clipped away and smoothed with bone-cutting forceps, impressions were taken and upper and lower partial plates were made. The impressions were sent up to Paris by parcel post to a mechanical dentist and were returned in about a week.

Dorleac was wounded at Verdun in September, 1916; the exact nature of the wounds has escaped me. He complained of a toothache in the upper first molar on the right hand side. In excavating this cavity the pulp was exposed; this necessitated its devitalization. Arsenic was sealed in the cavity for two days. The rubber dam was applied and the pump removed and the canals enlarged with phenol sulphuric acid and sodium of potassium. Wires were placed in the canals and the tooth radiographed. The radiograph showed the wires passing through the apex of the three roots. The root canals were then filled, first using Calahan's rosin and chloroform solution followed by chloropercha and gutta-percha points. The radiograph showed three canals filled perfectly. This was the only molar the roots of which I attempted to fill, and I

would not have attempted it in this case had I not accidentally exposed the pulp. After the root canals were filled the cavity was lined with copper cement and an amalgam filling inserted.

As a general practice, in a military hospital, it is not advisable to attempt to fill the roots of pulpless molars. The time consumed is too great. It is better practice to remove all such teeth. But the anterior teeth whose root canals may be filled and if an infected area is disclosed by the radiograph the root ends may be resected.

Santoecha—nicknamed Smiles by the nurses—was wounded at Verdun. I have no record of the nature of his wounds. An examination of his mouth showed an excellent set of teeth in a sound condition except the right central, which had been devitalized by a fall or a blow. A radiograph of this tooth revealed an area of destruction at the apex. With the rubber dam in place the contents of this root and showed the cavity in the bone destroyed by with phenol sulphonic acid, sodium and potassium. The canal was then filled using the technic previously outlined and the tooth cavity filled with synthetic cement. Having decided to resect the root, infiltration anesthesia was used on this tooth, with a tampon of novocain in the right nostril. A crescent-shaped incision was made about 3-8 of an inch above the gum margin over this tooth, with the bow of crescent downwards. A periosteal elevator raised the periosteum from the bone and pushed back the flap. A four-pronged retractor was inserted under the flap and held up out of the way by Dr. Savage,



French nurse preparing novocain solution.

the surgeon who assisted me. With gouges the outer plate of bone was removed from around the region of the root end about the size of the end of a large lead pencil. This uncovered the end of the root and showed the cavity in the bone destroyed by the pathological process. With two sharp blows of the hammer on a straight chisel the root end was resected. The resected end was easily removed and the cavity curetted out. The root end was then smoothed by a surgical bur. The cavity was then flushed out with normal saline solution, then painted with iodine. The flap was brought down and the wound closed with three silk stitches. The stitches were removed in five days and the wound healed. The entire operation took three-quarters of an hour.

Verney Louis, private, was wounded at Verdun, June 16, 1916. He had a seton of the thigh. He was also wounded in the abdomen and had three large wounds in the lower part of the right leg. An examination of his mouth revealed a broken down upper first molar and a broken down second lower molar and first bicuspid. Under infiltration injection for the upper first molar, and a mandibular injection for the lower second molar and bicuspid these teeth were extracted and the sockets curetted of their pathological tissues and packed. A radiograph of the upper right cuspid showed an area of destruction. The canal of this tooth was sterilized and filled. One morning Monsieur Germain Baptist of the French foreign office visited the hospital. As the general surgeons had no operations that morning, Dr. Eugene Pool, the *medecin chef*, suggested that I resect the root to show the work of my department. With the assistance of Dr. Savage the root was resected in about fifteen minutes. As he had never seen such an operation before he was much interested and pleased. He commented on it in his lecture in Sens the same evening. In this case the wound was packed with iodoform gauze and the dressing changed every other day. It healed in about eighteen days. A synthetic filling was placed in the tooth cavity. Later an impression was taken and he was supplied with an upper partial plate.

Leo Geoffrey, a tall, well-built peasant, was wounded at Verdun, June 30th. He had several small wounds about the middle of the right leg and an oblique fracture of the tibia. An examination of his mouth on September 25th disclosed the remains of a broken down and infected second molar on the lower right hand side and an infected upper right first molar. These were extracted under conductive anesthesia with elevators. After curetting the socket of the lower second molar and smoothing the

rough alveolus, the curette at the bottom and distal part of the socket slid over something quite hard and smooth. The socket was syringed out and the enamel of the third molar was seen. The socket was painted with iodine and packed with iodoform gauze. An X-ray plate and film were taken of the tooth in the afternoon and disclosed a large impacted molar in the angle of the jaw. The following day under novocain conductive anesthesia, the tooth was removed. A triangular piece of bone was removed with the chisel from the distal and buccal side of the molar and the molar tilted out with elevators. This took about an hour and a half to accomplish. The alveolus was smoothed with a curette and bone-cutting forceps and the socket packed with orthoform and iodoform gauze. This was changed every two or three days until he left the hospital.

The impression seems to prevail that work in a base hospital is one ceaseless effort. This idea is a mistake. The organization of the hospital service for the French wounded is the following.

As previously indicated Hôpital Française de New York received its wounded from Verdun. The region in which the hospital is located is known as the Fifth Region. In this region are a number of hospitals scattered through small towns and villages with a total capacity of 16,000 beds.

Every week, sometimes twice a week, our hospital was inspected. The patients were examined and a list made of those patients who were in such condition of convalescence, that in the event of a serious engagement, they could be sent to hospitals farther south, to make room for the anticipated wounded. The list was usually made out by the *médecin chef* of the hospital and later changed or added to by the inspector of the region. This list was made up of two classes of wounded, *assis*, or those that could walk, and *couches*, those who must be carried on stretchers.

When a serious engagement is planned or expected, an order is sent out to the hospitals in the region in which the engagement is to take place, to evacuate a specified number of *blessés*. This number usually coincides with that of the list made out by the inspector of the region. The *Chef* of the *Service de Santé* in this region, then knows that when the engagement does take place there will be ready for immediate reception of wounded—let us say, for example, in this fifth region, ten thousand beds. When the work of distributing the wounded takes place either by sanitary trains or ambulances each hospital is notified by telephone to prepare to

receive and to take care of a certain number of wounded.

If after a hospital has been evacuated of a certain number of wounded and the expected engagement is either postponed or does not take place—then the hospital is left with but a few wounded and little work for the staff to do. Such a condition may last for weeks—then without any hint or warning the telephone bell will ring and we will be instructed to meet the sanitary train with our ambulances for the reception of let us say, as actually occurred, sixty blessés, at eight P. M.

In our hospital after the receipt of such a message this médecin chef orders large chaldrons of water to be heated. With this the wounded on their arrival at the hospital are washed and bathed. Then stretchers are placed in the ambulances. Beds prepared in the reception ward and everything made ready for the reception of the blessés. The ambulances then start for the railroad station and line up in a convenient place.

The stretchers are gotten out stacked on the station platform to exchange for those upon which the blessés are carried from the train. Awaiting the arrival of the sanitary train is a time of anticipation and speculation as to the nature of the wounds to be dealt with. When the train comes into the station and stops, it does so without a jar or a jerk—as smoothly as one's hand slips into one's pocket.

The wounded are most carefully removed from the train and placed in a row on the platform. The stretchers are exchanged and the médecin chef of the hospital gives the médecin chef of the train a receipt for the number of wounded received. Then the train moves on to another station where the remaining wounded are distributed to other hospitals.

In the pale moonlight these sixty wounded lay on the station platform, swathed in bandages. With a lump in my throat I gave a cigarette to each man who wanted one. It did not seem to matter how badly they were wounded, the cigarette was welcome. There were a few women in this little town who never failed to bring hot coffee and milk for the wounded, no matter what time of day or night they arrived.

Each man was tagged with his descriptive tag, which gave name, regiment, date he was wounded, the nature of his wounds and whether or not he had received antitetanic serum.

The blessés were then placed in the ambulances, four in each Ford and driven carefully to the hospital. Here their uniforms were taken off and later sterilized. Their valuables were placed in a

small white bag with their name attached and taken in charge by the military secretary.

They were then washed with soap and hot water, clean pajamas put on and then put to bed. This was all accomplished in about two hours after their arrival.

No operations were performed that night. The work assigned to me the following morning was that of removing dressings of about forty wounded. Many of these wounds were terrible compound fractures. All wounds were infected and suppurating. Some of the feet and hands, arms and legs had the appearance of an internal explosion. After the removal of the dressings the surgeons and nurses followed.



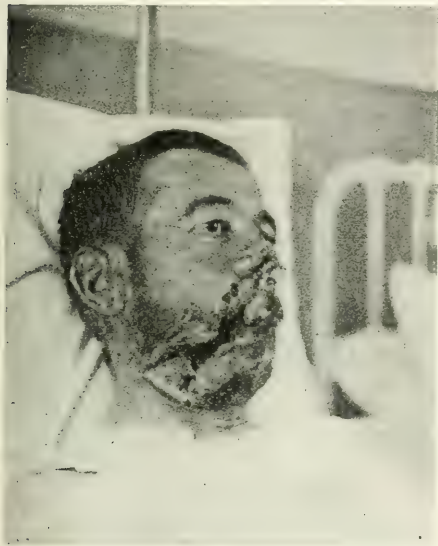
Dr. Joseph Blake (to right), Dr. Roche (to left).

Sketches were made of the wounds and their condition noted. If an immediate operation was indicated that also was made part of the history. If a case required x-ray or a fluoroscopic examination, that, too, was stated. Then fresh dressings were applied as soon as possible. Almost all fracture cases needed new splints with suspension and tension and some with continuous irrigation. To each surgeon was assigned an equal number of cases and his name placed on the charts.

In making "the rounds" with the médecin chef we came across a blessé, St. Paul, upon whose chart no surgeon's name appeared. He had been overlooked because he happened to be in a bed away off in a corner. He had a head wound and an elbow wound. The médecin chef asked me if I thought I could look after him and if so to put my name on his chart. My name went on the chart.

Then I removed the starch bandages from his head and found two shrapnel wounds above and behind his ear. The pieces of shrapnel had been removed but the wounds continued to discharge. These wounds were dressed each day with gauze and the healing process stimulated with nitrate of silver. The elbow wound had two drains. This wound was irrigated with boric acid solution and dressed with wet boric acid dressings every day. After two weeks the elbow wound showed no marked tendency to heal but the discharge had lessened in amount. There seemed to be a collection of fluid in the joint

hand size about twice the size of a normal lip. Under novocaine I dissected out a V-shaped section of the vermilion border including the scar tissue. Three sutures brought the edges of the wound together. When the sutures were removed and the wound healed the lip had not been reduced enough. Another and deeper section of the lip was then dissected out and the wound sutured with two horse-hair sutures. These were removed in five days leaving a normal lip. It was painted with iodine for several days to reduce the slight swelling produced by the operation and sutures.



Shell wound of face.



Dental and anesthetic equipment

which the drains did not reach. Under ether I made an incision into the pocket of fluid and inserted a drain deep enough to allow the fluid to escape. In about three weeks the head wounds had healed and the fourth week the arm showed considerable improvement so that only small rubber tissue drains were required.

Maurice Delcourt, from the captured city of Lille, was wounded at Verdun. He had a badly fractured tibia with the loss of considerable bone substance. He had had a gas bacillus infection in his fractured leg which nearly cost him his life. A bone graft was inserted in his tibia to supply the lost bone substance. After he had recovered from this operation he asked me to reduce his lip. In boxing with the French champion's brother Carpentier, his upper lip had been smashed. This produced a lip on the left

In addition to the routine oral and dental surgery I had the opportunity to assist in the major operations, sometimes giving the anesthetic.

I also assisted the surgeons in applying plaster of Paris splints. These consisted of plaster of Paris bandages applied over thin strips of wood. These kept the limbs in a firm and immobile position.

The mouth and teeth of my patients were kept in a clean and sanitary condition by the use of a solution made of vinegar one part, alcohol one part and water one-eighth part. This was used on a tooth brush if they had one, if not they used gauze with which to mop and wipe their teeth and gums.

Some of the most interesting experiences I had while in France were the visits to several French and American hospitals.

One day we motored to the Dr. Joseph Blake hos-

patient, Rles Danges. I had a letter of introduction to him. With the other surgeons we had dinner at the hospital. Later we saw Doctor Blake remove a piece of shrapnel from the vicinity of a man's heart.

On another occasion we visited the Mechano-Therapy hospital at Fontainebleau. The hospital occupies part of one of the wings of the famous Chateau de Fontainebleau.

In the hospital are a great number of ingenious devices for the re-education of limbs whose functions have been impaired. There were also all kinds of baths and electro-therapeutic appliances for treating nerve cases and contracted limbs.

The Chateau is the famous and beautiful Fortes of Fontainebleau. Before the battle of Marne the German Army penetrated France to within fourteen miles of Fontainebleau. At that time many of the most valuable treasures of the Chateau were removed to places of safety farther south. When we visited it all of them had not been returned.

On another occasion we visited some French Red Cross Hospitals at Melun. This gave us the opportunity to notice the difference between the American hospitals and the French hospitals. In these hospitals the French Red Cross nurses had practically no training or experience prior to the war. In some of them there was no resident surgical staff. The surgeons had their headquarters in one of the other hospitals and visited these hospitals for dressings and operations. In some of the hospitals the Red Cross nurses were only on duty in the daytime.

We had the opportunity to see Doctor Roche perform a nerve suturing operation and were shown the cases upon which this operation had been performed.

In some cases there was a partial return of function of the nerves and in others the results were negative.

In the three or four hospitals of this town there were no Dental Surgeons.

On another occasion we visited the Val de Grasse Hospital in Paris. This is the great military hospital in which the military surgeons are trained. With its annexes it has about 5,000 beds.

Doctor Morestin operates in this hospital in addition to five other hospitals in Paris. Doctor Morestin is the great plastic surgeon and his work is considered by Doctor Pool to be the standing surgical feat of the war. We had the opportunity of seeing hundreds of cases of face, nose and jaw wounds in all stages of treatment and repair. We saw cases that had just arrived and cases that had been completed. We spent the entire morning with Doctor Morestin and returned in the afternoon to see him operate. One of the cases he operated on was for the removal of an aneurysm of the common carotid artery.

ANESTHESIA IN WAR SURGERY *

HENRI VIGNES, M.D.

FRANCE

During a recent offensive I had charge of handling 471 wounded soldiers, brought direct from the battle field after the lapse of from one and a half to four hours. All were submitted to whatever intervention was necessary to permit their evacuation to the rear. This series included 34 wounded with partial or complete fractures. Others of the blessés required removal of debris, cleansing, drainage and hemostasis, some excision of contused and torn tissue and many extractions of projectiles. Two hundred and two projectiles were searched for and 178 extracted. All but one of the projections *not extracted* were in the hand or lungs.

General anesthesia with ethyl chlorid, ether and chloroform, alone or in sequence, with or without morphin, was used, as was also local anesthesia with cocain, stovain, novocain, neocain with adrenalin and preliminary morphin, and also quinine-urea hydrochlorid. General anesthesia was used in 55 cases; local in 198 and 185 injections of morphin were given, usually 0.01 gm., rarely 0.02 gm., ten minutes before operation, and frequently in the neighborhood of the wound. Few of the cases were suitable for regional anesthesia.

We always allowed a lapse of eighth minutes for the anesthetic to take effect before operating and with quinine-urea this period was lengthened to 20 minutes. Team work in the operating-room enabled us to alternate operations and dressings while the wounded were being anesthetized. Spinal anesthesia was not used.

Ethyl chlorid was used alone for brief anesthesia or in sequence with ether or chloroform. It was sprayed on a compass of gauze closely adapted to the contour of the face. Preliminary morphinization secured a profound and prolonged anesthesia. While there were no untoward complications with general anesthesia cases, in which cocain analgesia proved unsatisfactory, and general anesthesia was substituted, were inclined to show a stage of excitement. In one instance under chloroform anesthesia, while searching for a projectile, a general convulsion followed each time the instrument touched an exposed nerve.

The results with local anesthesia were mostly entirely satisfactory to the patients and operator; and were only so considered when no signs of pain or discomfort were manifested during operation or complained of afterward.

* Read before the Société de Pathologie Comparée, Paris, France. Editorial abstract for American surgeons and anesthetists.

Under local anesthesia, especially with the addition of adrenalin or pituitrin, there was little or no alteration of the pulse-rate during or immediately after operation, the maximum difference being about 30 beats, the minimum 2; and the changes were not incidental to any failure of the analgesia. Pituitrin showed a more stabilizing effect on the circulation than adrenalin.

INDICATIONS FOR GENERAL ANESTHESIA.

Except for simple, painless dressings, any other surgical procedure on the wounded in this war, absolutely demands either the use of general or local anesthesia. With Pierre Moiroud I have already emphasized this point. The cleansing, the removal of debris from and the draining of the wound with counter-openings are all operations demanding minute care. It is the present practice to excise all the contused tissues. One cannot do that properly and thoroughly without the aid of anesthesia or analgesia.

Paradoxical as it may seem, anesthesia is the best prophylaxis against shock.

It is the pain of operation added to that of the trauma that is the principal cause of shock. This is in keeping with the researches of Crile. Evidently general anesthesia administered to a shocked patient is an aggravating factor, but the risk is less than that involved in operations without anesthesia. It is most important to conserve the stability of the circulation from nervous shock. There is no sense in being insouciant about inflicting pain under the belief that it is harmless.

INDICATIONS FOR MORPHIN

Interest attaches to the use of morphin in conjunction with both general and local anesthesia. As a preliminary to general anesthesia, morphin decreases the likelihood of excitement during induction and surgical narcosis is more readily secured, while a small dosage suffices for maintaining anesthesia. Morphin acts as a prophylactic measure against the incidence of acapnia. It also diminishes postoperative complications. For all these reasons the preliminary injection of morphin, with or without the addition of such circulatory stabilizers as ether, pituitrin, and adrenalin, is an excellent means of diminishing the dangers of intoxication and shock.

R. Picque has well said: "*Anesthesia must be the object of the solicitude of the surgeon. . . . When one has admired the resources in action and the resignation to suffering of those, whom history continues to call the poilus, one cannot tolerate for an instant the thought of their suffering further through a negligence of anesthesia.*"

The results obtained from the preliminary injection of morphin in local anesthesia have always appealed to me.

INDICATIONS FOR LOCAL ANESTHESIA

Many and varied surgical procedures can be satisfactorily handled under local anesthesia. I have had no difficulty in excising contused tissues and removing debris; in cleansing the site of fractures, especially those of the tibia, and in removing projectiles deeply imbedded in the thigh, loin and regions of the scapula.

Team work in the operating room must be relied on for sorting out the patients that can be best handled under local or general anesthesia. Substituting general anesthesia, after beginning with local, leaves a disagreeable impression on the patient, means loss of time and opens the way to unnecessary infections. It is important then to determine the contra-indications for local anesthesia, both in connection with the site of operation and the lesions that are anticipated.

Vascular regions which bleed freely and others in which dissections are difficult are unsuitable for local anesthesia. When important organs are involved, when tendons and aponeuroses cross the operative field, when it is difficult to see the lesions, or when a retractor is necessary, general anesthesia is indicated.

On the leg the crural space and the popliteal region are least favorable for local anesthesia because they contain important structures and necessitate tedious and delicate dissection. Except for the bulge of the calf the lower leg is unfavorable for local anesthesia on account of the arteries and varicose veins that are encountered, while the instep is crossed with tendons.

The bend of the elbow, the lower arm, the wrist and palm of the hand are regions unsuitable for local anesthesia. The palm of the hand, in particular, is very sensitive. I have repented, on several occasions, searching for even superficially imbedded projectiles in the palm, under local anesthesia.

Deep wounds of the neck must be operated on under general anesthesia.

On the contrary, exploratory incisions of the scalp should be done under local anesthesia. DeMartel advises the employment of novocain-adrenalin for all intracranial surgery of war wounds.

Great discretion must be used in selective anesthesia, as the real conditions of the wounds cannot be anticipated and are often more extended than suspected and require considerable intervention. The violence of the projectiles, the destructive shattering of bones and the hernias of different layers of the

musculature cannot be definitely forecast previous to operation. In case of doubt it is better to use general than local anesthesia.

When the symptoms indicate extensive internal destruction of tissues and not merely a perforating tract, general anesthesia is indicated. While local anesthesia may suffice for the anticipated procedure, it not infrequently happens that it is insufficient for accomplishing what is finally necessary for a complete surgical toilette, or what M. Gaudier calls, a complete excision of the wounded area. Such removal diminishes the risks of complications from infection and provides scars which do not interfere with anatomical function.

Injuries of large blood vessels with hematoma, requiring turning out of the clot and ligation, cannot be handled under local anesthesia. If x-ray and the localization of the pain indicate more damage to the soft part than the bone, these cases may be done under local, but in the presence of periosteal involvement, when extended interference is demanded, general anesthesia must be used.

INDICATIONS FOR DIFFERENT LOCAL ANESTHETICS

Cocain, novocain and stovain have given us excellent results, but if it is anticipated that general anesthesia must supplement the local, it is better to use stovain or novocain to avoid the cocain excitation during the induction of anesthesia.

For prolonged and extended operations it is advisable to use quinine-urea hydrochlorid on account of its control of after-pain. It should be recalled, however, that quinine-urea diffuses very slightly through the tissues and the injection must be very accurately made.

INDICATIONS FOR DIFFERENT GENERAL ANESTHETICS.

Ethyl chlorid should be used whenever possible. A preliminary injection of morphin provides a prolonged operative period. Ethyl chlorid anesthesia presents the great advantage that the wounded operated on shortly awoken to complete consciousness and in consequence can be more readily evacuated to the rear.

The respective indications for chloroform and ether are the same as for civil practice. However, it is important to administer ether in such a way that its volatilization will not be interfered with by the low temperature in which it must occasionally be given in the surgery of war.

CONCLUSIONS.

It is very important to have specialists in anesthesia at the front.

Anesthesia must not be made an easy berth for the physician who is sent by chance to a military, surgical ambulance. Each surgeon should have his

own anesthetist, who should be an expert in his specialty and should be conversant with the most recent advances.

If it is necessary to use members of the ambulance corps to give anesthetics, when a physician is not available, these should have had thorough training in the administration of general anesthetics, especially etherization with an Ombredanne inhaler—a method which minimizes the risks involved.

Familiarity with the stock apparatus provided enhances the results of general anesthesia and if the Ombredanne and Ricard apparatus are both at hand, better work will be done.

Warmed vapors, as used by certain American and English anesthetists, induce anesthesia more rapidly and pleasantly, and produce less irritation of the respiratory tract, less nausea, shock and fewer postoperative pulmonary complications. This method deserves study and use, as do other technics, which are at present little known among the profession in France.

SOME OBSERVATIONS ON LOCAL ANESTHESIA FOR CERTAIN OPERATIVE PROCEDURES; AND ITS EFFECTS ON BLOOD PRESSURE.*

LEIGHT F. WATSON, M. D.
CHICAGO, ILL.

Local Anesthesia has its limitations the same as any other method of anesthesia. It cannot be successfully employed for every operation nor can it be used on all patients. In some instances it is not suited to the temperament of the patient; in others, the operation is one that should not be attempted by local alone. The variety of major operations that is possible to be completed by local, depends upon a proper selection of cases and the experience of the operator; his patience, his gentleness in handling tissues, and special training in the method. Bodine, Mitchell and Allen perform a majority of their surgical operations under local—the greater number of their patients come to them because they use local anesthesia.

ESSENTIALS FOR SUCCESS WITH LOCAL ANESTHESIA.

The first requisite for the successful use of the local method is an accurate knowledge of the nerve supply and the ability of the operator to block off completely every sensation of pain. When the nerve supply cannot be entirely controlled, general anesthesia should be employed.

* Read during the Joint Session of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917.

The sensation of pain is confined to the skin, nerve trunks, parietal peritoneum and synovial membrane of the joints. Lennander has demonstrated that all internal organs obtaining their nerve supply from the sympathetic and vagus, below the branching of the recurrent nerve, have no sensation. For this reason the abdominal and pelvic viscera are insensitive to heat, cold, pain and pressure, both in health and disease. There is no sensation of pain in bone substance, bone marrow, cartilage, tendon, articular surface of bone covered with cartilage, brain, lung,

for each operation, and of a definite strength, so that the operator may at any time know the exact amount of anesthetic that has been used. The drug must be sterile and dissolved in sterile normal salt solution. Cocain and novocain can be sterilized by heating to 212° F.; a temperature above this, as well as repeated sterilizations, are injurious.

Different operators prefer various syringes. I have found an all metal syringe holding ten c. c. very serviceable. The syringe should take a slip needle to facilitate rapid refilling.

Local Anesthesia.
Fracture of Skull.
No morphin.

Dr. L. F. Watson
Mr. C.—Aged 20.

DECOMPRESSION.

Hour.	Pulse Rate.	Blood Pressure.	Remarks.
5:30	42	82	Struck over left Parietal Bone, 1 p. m.
:35	38	82	Deep Coma 2 hours.
:40	42	84	Nerve block of scalp.
:45	40	85	Blocking subcutaneous tissues.
:50	45	92	Scalp incised.
:55	45	95	Periosteum retracted; T fracture.
6:00	46	118	Skull trephined.
:05	42	118	Flap cut with DeVilbiss ronguers.
:15	52	118	Bone flap removed.
:20	60	118	Dura lacerated; large blood clot.
:25	60	118	Hemorrhage from brain.
:30	60	115	Piece of muscle into site of hemorrhage
:35	58	118	Hemorrhage checked.
:40	60	118	Closing scalp.
6:45	60	118	Patient rational and conscious.

It is apparent from this chart that local anesthesia in decompression operations has several advantages over general narcosis

liver, heart, kidney, kidney pelvis, ureter, bladder serosa and intestines.

A slight twinge of pain is felt when blood-vessels are cut. Traction on the ligaments of the thoracic, abdominal or pelvic viscera will cause pain; traction on the mesentery, besides producing pain, will cause epigastric discomfort and nausea. I have frequently noted the pain of ligating the meso-appendix when it has not been previously blocked with local anesthesia.

SOLUTIONS, SYRINGE AND NEEDLES.

Novocain one-fourth per cent. solution, or cocaine one-tenth per cent. solution, is strong enough for any operation. Adrenalin (1:10,000) five minims to the ounce of anesthetic solution is usually employed to give prolonged anesthesia. The solution should always be freshly prepared

Combined Anesthesia.
Acute Appendicitis.
No morphin.

Dr. L. F. Watson.
Miss H.—Aged 18.

APPENDECTOMY.

Hour.	Pulse Rate.	Blood Pressure.	Remarks.
11:08	135	122	Before operation.
:05	125	130	Skin and subcutaneous tissues blocked.
:10	125	122	Skin and subcutaneous tissues incised.
:15	120	118	Aponeurosis and muscles blocked.
:22	120	118	Incision completed to parietal peritoneum.
:25	108	110	Parietal peritoneum blocked.
:30	100	110	Exploring finger in the abdomen.
:35	82	110	Ether for freeing appendix.
:38	115	110	Ether stopped; Appendix removed.
:40	86	115	Parietal peritoneum closed.
:45	78	118	Muscles and fascia closed.
11:50	74	115	Skin sutured; Patient awake.

This chart shows the depressing effects of pain in the presence of adhesions and inflammation, indicating use of concomitant etherization with nerve blocking. Note that at the end of operation the pulse was normal and there was no change in blood pressure.

The needles must be kept sharp and clean; the smallest size should always be used for the initial infiltration of the skin.

ADVANTAGES.

As there is no danger of post operative pulmonary, cardiac or nephritic complications following local methods, many operations can be satisfactorily and safely performed in the patient's home, when for any reason he refuses to go to a hospital. The family ironing board makes a convenient operating table—if it has no legs, it can be placed across the backs of two chairs. Either at home, or in the hospital, the patient should be made comfortable on the operating table, which should be well padded with extra blankets or quilts; a hard table will quickly cause him to become tired and restless.

As there is no necessity for speed with the patient conscious and comfortable, fewer assistants are required than with general anesthesia.

Many patients will consent to operation under the local method who would not consider it if it involved a general anesthetic; this applies especially to those who have had a stormy and protracted convalescence after taking ether.

Allen sums up the advantages of the local method as follows: Absence of fear of the anesthetic; absence of post-operative disturbances; no danger of post-operative dilation of stomach

Allen says: "Local actually contraindicated only in children, epileptics, and highly nervous or neurotic subjects. The loss of consciousness is not necessary for the successful performance of an operation, and with the patient's restlessness and possible anxiety allayed by a small preliminary dose of morphine or morphine and hyoscine, the fact that the patient is conscious becomes a negligible factor for the successful completion of the operation."

SCOPE OF LOCAL ANESTHESIA.

In selecting the anesthetic for a major opera-

HERNIOTOMY.
Left Crural Hernia.
No opiates.

Dr. L. F. Watson.
Mr. D.—Aged 30.

Hour.	Pulse Rate.	Blood Pressure.	Remarks.
9:30	—	130	Before operation.
40	62	130	Infiltration of tissues.
43	64	130	Incision completed to Ext. Oblique.
50	65	128	Blocking regional Nerves.
52	60	130	Adhesions of sac freed.
55	58	124	Sac opened and omentum freed.
58	58	128	Blocking peritoneum at internal ring.
10:00	58	130	Sac ligated and excised.
10:05	66	130	Con. tendon sutured to Poupart's lig.
10:10	58	130	Suturing Ex. ob. aponeurosis to P. lig.
10:15	58	130	Subcutaneous tissues and skin sutured.
10:25	58	130	Operation completed.

Throughout the entire operation there was practically no change of pulse rate or blood pressure.

or tympanities; no post-operative backache; no vomiting and straining to weaken abdominal incisions; no necessity to starve patient beforehand—the regular post-operative nourishment of debilitated patients is not interfered with.

CONTRAINDICATIONS.

The local method is positively contraindicated in the patient who does not want it—who prefers for any reason to be asleep during operation. It is a mistake to urge local anesthesia on the skeptical; and without exception, I administer a general anesthetic to this type of patient.

When there are intra-abdominal adhesions or when the condition is one in which the nerve supply cannot be completely blocked, as is the case in deep pelvic or abdominal operations, a general anesthetic is indicated.

AMPUTATION.
Combined Anesthesia.
Tuberculosis of ankle.
No morphin.

Dr. L. F. Watson.
Mr. B.—Aged 19.

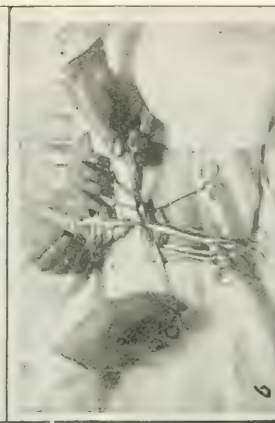
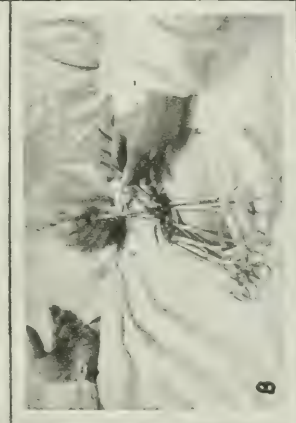
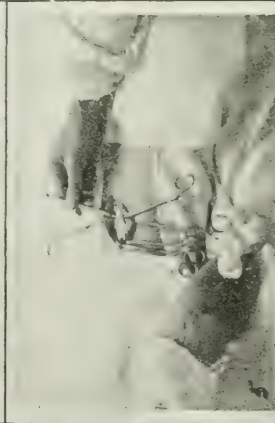
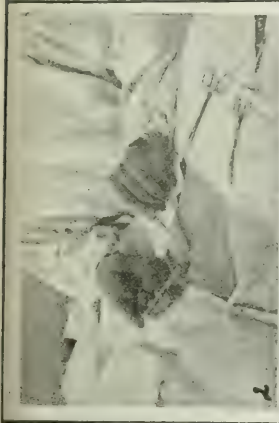
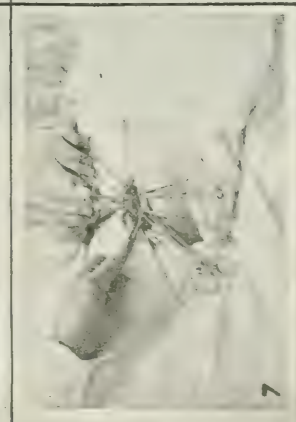
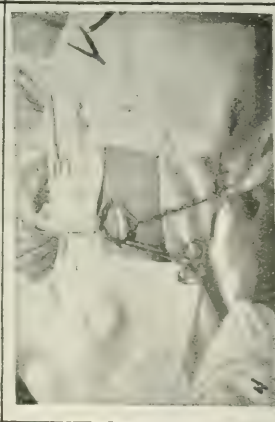
Hour.	Pulse Rate.	Blood Pressure.	Remarks.
9:40	140	100	Before operation.
9:45	140	100	Ether anesthesia; excitement stage.
9:50	150	118	Skin incised.
10:05	145	115	Muscle cut and periosteum retracted.
10:10	142	100	Tibia and fibula sawed.
10:15	142	102	Amputation completed.
10:20	140	102	Ether stopped.
			Nerve blocking of skin and muscles.
10:25	135	98	Skin incision for second amputation.
10:30	120	100	Muscles incised.
10:32	115	100	Periosteum blocked.
10:35	110	98	Tibia and fibula sawed.
10:40	105	90	Skin flaps trimmed.
10:45	105	98	Tourniquet loosened.
10:50	112	95	Traction on nerves; vessels ligated.
10:55	102	90	Muscle sutured.
11:00	102	94	Skin sutured.
11:01	100	96	Operation complete.

This chart shows the prompt improvement in the pulse under nerve blocking after etherization.

tion, one must first of all consider the risk to life of the patient. Local anesthesia adds greatly to the safety and comfort of the young and robust, and when the patient is handicapped by old age, shock, hemorrhage, pulmonic, nephritic, or cardiac lesions, the local method is especially indicated, if he is to be given the greatest chance for recovery. Allen states that outside of a few large clinics, the mortality of general anesthesia remains as high as it was twenty years ago, in spite of improved methods of administration.

OPERATIONS ON THE EXTREMITIES.

In dislocations, fractures and amputations of the fingers and toes, simple infiltration around the base of the digit is all that is required for successful analgesia. For operations above the wrist and ankle, the regional nerve block method



APPENDICETOMY UNDER LOCAL ANESTHESIA.

1. The initial infiltration is made with the point of the needle very superficial.
2. The skin is held up and the infiltration continued.
3. The deep tissues are injected.
4. Incision completed down to aponeurosis of external oblique muscle.

9. Appendix freed from meso-appendix and adhesions.
10. Parietal peritoneum blocked with quinin and urea to prevent after pain.
11. Post operative nerve block of skin.
12. Operation completed; patient is free from shock and nausea.

of Matas is most satisfactory and quicker than local infiltration.

OPERATIONS ON THE SKULL.

Trephining, exploratory craniectomy, mas-

tration anesthesia of the skin, fascia, muscles and periosteum, is all that is needed.

PERINEUM AND CERVIX.

Perineorrhaphy, trachelorrhaphy and cystocoele



HEMORRHOIDECTOMY UNDER LOCAL ANESTHESIA.

Fig. 1. Combined external and internal piles; patient in the Sims position; the external hemorrhoids in view. (2) A pledget of cotton saturated with the anesthetic solution is applied to the anus to produce analgesia of the mucosa. (3) The needle carefully introduced through the anesthetized mucosa infiltrates the mucocutaneous margin of the anus. (4) The skin infiltration is completed. This is sufficient for external hemorrhoids. (5) The index finger of the left hand is introduced into the anus and the sphincter muscle located. The muscle is anesthetized by making six to eight punctures at equidistant points around the circumference of the anus, at each injection ten to

fifteen minims of solution is infiltrated into the muscle. (6) The sphincter is now painlessly relaxed by digital dilation. (7) This shows the amount of divulsion possible under local anesthesia. (8) With the sphincter relaxed the internal hemorrhoids are everted and there is no chance of their being overlooked. (9) The lowest pile is pulled down with a hemostat, and a groove cut around its lower two-thirds, going through the skin and mucosa. This prevents post-operative pain. (10) The ligature is transfixed through the pile to prevent slipping. (11) The ligature is firmly tied in the mucocutaneous groove. (12) This shows the ligature operation completed.

toideotomy and removal of depressed fractures are easily performed under local anesthesia, greatly to the safety of the patient. The bone, dura, and brain substance are insensitive. Infil-

operations can usually be performed under local methods.

MAJOR ABDOMINAL OPERATIONS.

All forms of inguinal, femoral, ventral and um-

bilical herniae can be operated on under local anesthesia. A general anesthetic is never indicated except in children and the neurotic. For strangulated hernia in patients with lowered vitality, the local method is a necessity to eliminate the additional shock of general narcosis.

Interval cases of appendicitis, selected cases of acute appendicitis, can often be completed under local. In case a whiff of general anesthesia is required for freeing the appendix, the preliminary opening of the abdomen under local is a distinct advantage to the patient in lessening the amount of general narcosis.

In selected cases, I have completed the following operations under local anesthesia: Herniotomy, appendectomy, nephropexy, cholecystotomy, suprapubic cystostomy and prostatectomy, gastro-enterostomy, colostomy, resection of the tubes and ovaries and suspension of the uterus.

APPENDECTOMY.

Local anesthesia has generally been unsatisfactory in appendectomy. Many operators regard it as being adapted only to selected cases of simple interval appendicitis, in which adhesions are believed not to have formed.

INCISION.

Success with local in appendicitis depends largely on the position of the incision. The McBurney incision is too far removed from the appendix for the local method, because too much manipulation is required to expose the appendix. Many writers have noted that the base of the appendix lies below the McBurney incision in the live subject. Sabotta-McMurrich states "the caecum lies in the right iliac fossa with its lower extremity at the level of the center of Poupart's ligament."

A point one and a half inches from the right anterior superior spine, on the level with a line connecting the two superior spines, should be selected for the beginning of a vertical incision which should extend from this point directly downward for about two inches to the outer side of the upper part of the internal abdominal ring.

ANESTHESIA OF THE MESO-COLON.

In the majority of cases it is necessary to proceed as follows: the caecum is grasped gently with pledgets of gauze and displaced to one side, usually inward, exposing the meso-colon supplying the lower portion of the ascending colon, caecum and appendix. A small quantity of anesthetic solution is injected through a very fine needle at short intervals along the meso-colon for a distance of three or four inches, for the pur-

pose of blocking the cerebro-spinal sensory nerves, which are responsible for the pain following traction on the mesentery and the separation of adhesions. When the patient states that manipulation is painless and without referred epigastric discomfort, the first attempt is made to locate the appendix. While anesthesia continues complete the adhesions are separated, the meso-appendix ligated and the appendix removed in the usual manner. The necessity for gentleness in handling the intestine is important, lest one make unnecessary traction on portions of the mesentery that have not been anesthetized.

CONCLUSIONS.

1. Local anesthesia should be employed only when it is suited to the temperament of the patient, and when the operation is one in which it is possible to block off completely every nerve off sensation, thus preventing all pain.

2. Success with local anesthesia in appendectomy depends largely on making the incision directly over the appendix, and a complete block of the nerves of sensation in the meso-colon.

3. The surgeon should not insist on local for the patient who is skeptical or who does not want it. To such persons a general anesthetic should always be given.

30 N. MICHIGAN AVE.

CAUSES OF FAILURE AND UNTOWARD RESULTS IN CONDUCTIVE ANESTHESIA.*

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NEW YORK CITY.

Unlike numerous *innovations* in dentistry, conductive anesthesia has successfully steered past the shallows and cliffs of *fadism*. Surprisingly few indeed have been the open admissions and reports of failure or untoward results arising from the employment of this method, although the men who have been pioneers and instructors in this doctrine know very well, from consultations and daily correspondence, that disappointments and failures have been attending the efforts of their followers and pupils. To point out the most prevalent and most likely

* Read before the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917; and also before the Annual Meeting of the Ohio State Dental Society, Cleveland, O., December 4-6, 1917.

pitfalls that may be encountered in the routine practice of conductive anesthesia, is the purpose of this investigation.

Conductive anesthesia has by no means had an easy road to acknowledgment. The manufacturers of apparatus and the professional advocates of general anesthesia were for several years so busy deprecating the appearance and the advocacy of conductive anesthesia that, in their blind zeal, they heaped a full measure of wrath upon conductive anesthesia—usually without knowing the first principles about it—ruined their own stock-in-trade by belittling the intricacies and exacting requirements of general anesthesia, and overlooked entirely such moderate and truly fair statements as that made by the writer in *Dental Cosmos*, July, 1915, that "*no dental operator who is familiar with but one method of anesthesia should consider himself competent in anesthesia, nor can any dental office which offers anesthetic facilities of but one kind be regarded as efficiently equipped.*"

REQUIREMENTS OF AN IDEAL LOCAL ANESTHETIC.

It appears that so far none of the homologues of novocain or the many possible modifications of the synthetic substitutes for cocain measures up to the selected few local anesthetics adopted by the medical profession, for which Braun has set the following standard:

1. The substance must be less toxic than cocain in proportion to its local anesthetic power.
2. The agent must not cause the slightest irritation or tissue injury, but must be absorbed from the place of application without any secondary effects such as severe hyperemia, inflammation, painful infiltrates or necrosis. Only when these conditions are fulfilled can we assume that the healing of wounds will not be interfered with. The use of strongly acid or alkaline substances is not permissible, inasmuch as they cause local tissue injury. On account of this important requirement many of the newer anesthetics have failed in their purposes.
3. The agent must be soluble in water and its solutions stable and possible of sterilization by boiling.
4. It must be possible to combine the agent with suprarenin.
5. For particular places of application, as for instance, mucous membranes, the anesthetic must be able to penetrate rapidly, its anesthetic properties being dependent upon this quality.

NOVOCAIN-SUPRARENIN SOLUTIONS

Coming now to the actual causes for failures in conductive anesthesia, the preparation of solutions merits special attention. Stock solutions or pro-

prieties are *a priori* objectionable, since their keeping property depends upon antiseptics of some kind or other which, when injected, act unfavorably upon the tissues and frequently produce after-pain or even sloughing. As long as these concoctions are administered by way of infiltration only, the possible damage, which is of necrotic nature, may be confined to relatively superficial strata of tissue; for conductive anesthesia, however, their employment involves serious risk. The remedial alleviation of such untoward results, moreover, is complicated by the operator's ignorance of the quantity and nature of the antiseptics admixed, placing him in an extremely disadvantageous position medico-legally. Conscientious operators will strictly adhere to the principle that, if a patient is worth while treating, he is worth while making a fresh solution of definite constituency and percentage for.

Attempts have been made to combine the physiologic amount of sodium chlorid or Ringer ingredients with novocain-suprarenin to save the time and trouble of making a normal salt or Ringer stock solution separately. This like other admixtures is contraindicated as the combination of NaCl and suprarenin is unstable, and such combination tablets almost invariably yield discolored solutions.

This disadvantage was pointed out by the writer as early as 1914 (*Dental Cosmos*, December, 1914): "The addition of sodium chlorid to novocain-suprarenin tablets for the purpose of simplifying the preparation of isotonic solutions as practiced by some drug houses, should be discouraged, since they give discolored solutions within a very short time after purchase, and especially after a tube has been broached, proving that the combination of novocain-suprarenin and sodium chlorid is very unstable, chiefly owing to the hygroscopic property of sodium chlorid."

Nevertheless, a United States Patent upon this combination in principle has been granted.

Improper methods of preserving the tubes in which tablets are marketed, are a prolific source of annoyance to the operator. Prolonged exposure to heat, light and moisture results in decomposition of the tablets despite the precautions in packing exercised by the manufacturers. Dentists as a rule are very careless in their manner of preserving drugs, as a glance at the carbolic acid, silver nitrate, hydrogen peroxid or iodine contained in the average medicine cabinet will attest. The writer has been able to preserve tubes of novocain-suprarenin tablets without decomposition for years by placing his stock in a tightly closed Mason jar set in an equally tight tin bucket, which combination seems to act as a sort

of improvised thermostat when set away in a dark, cool closet of even room temperature. Additional stability of tablets is insured by dipping unbroached tubes into a solution of low-melting paraffin. Not more than one tube is ever broached at one time, and the sterile cotton and rubber stopper are immediately replaced under aseptic precautions. Prolonged direct contact between the uppermost tablet and the rubber stopper results in a reaction between the tablet and the sulphur in the rubber as manifested by brown discoloration of the tablet. It seems also that tablets prepared and packed during humid summer days are more prone to discoloration than those made up during the cooler months.

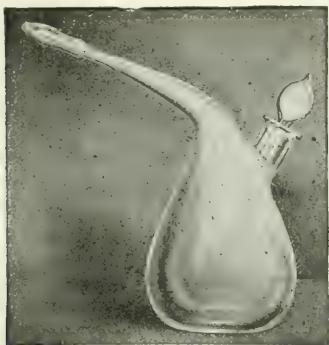


Fig. 1. Author's improved container for Ringer Solution.

Discolored solutions are viewed by most operators with suspicion and rejected. When this discoloration is due to intrinsic decomposition of the tablets or to organic contamination or alkalinity of the distilled water or the dissolving cup, this attitude is not only justified, but imperative. If, however, all precautions of asepsis have been carefully followed, and the solution which immediately after boiling was clear assumes a pinkish shade attributable to oxidation, heat and light, it may be employed with impunity. The writer has never observed any toxic symptoms following the injection of sterile though slightly discolored solutions. It goes without saying, of course, that dust, particles of saliva distributed in the air by breathing and speaking, or alkaline vapors from soap and sodium bicarbonate which ever pervade the air of an operating room must be excluded by covering the dissolving cup with a plate of colored glass or of porcelain, which is readily sterilized by passing the surface which comes in contact with the rim of the cup over an alcohol flame.

It has been observed that some operators fill their

dissolving cup with Ringer solution, add the novocain-suprarenin tablets to the cold solution and boil. This procedure is reprehensible because the tablets come in almost direct contact with the flame at the bottom of the cup where they are roasted, as it were,

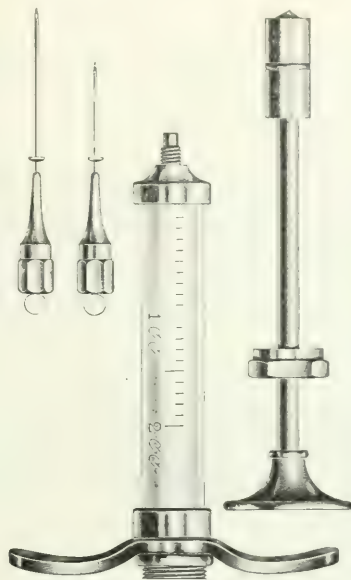


Fig. 2. This syringe holds $2\frac{1}{2}$ c. c. In its design, delicacy and lightness have been prime considerations. It is an all glass and metal syringe without washers of any kind, which for purposes of sterilization is taken apart in two sections. The glass and metal are annealed in such a way as to permit of vigorous prolonged boiling. All gnarled corrugated surfaces are avoided, and all corners are rounded off and the piston is made to end in a graceful indented end in which the ball of the thumb fits snugly. The cross-bar moves readily and the barrel is long enough so that the operator's second and third fingers find ample working space between cross bar and cheek so as not to obscure the field of vision. Although very light pressure only is required in conductive anesthesia, the syringe is tested to 30 lbs. pressure so as to allow of infiltration without regurgitation. To prevent the migration of a broken needle into deeper strata of tissue, the needles have been provided with a safety disc, wider than the lumen of the needle perforation, so that the needle fragment is automatically arrested. Since, according to the laws of mechanics, the needle, no matter whether of steel or iridio-platinum, must break at the orifice of the hub to which the needle is attached, the risk of losing a needle is eliminated, which fact may be especially appreciated by the beginner. To facilitate finding the inclination of the bevel of the needle, a mark is placed on the hexagonal hub in such a way that visibility of the mark indicates pointing of the bevel of the needle toward the bone. To avoid confusion the hubs of steel needles are nickel-plated, those of iridio-platinum are gold-plated.

long before the Ringer solution approaches boiling point. Such combined roasting and unduly prolonged boiling greatly impairs the clearness and stability of the resulting solution.

If hydrochloric acid is used to overcome the alkalinity of ordinary glass containers, great caution is advised not to over-acidulate, since intense and prolonged afterpain will follow injection of such solu-

tions. Alkali-free glass containers are now readily obtainable.

DISILLED WATER

The use of contaminated distilled water of the average drug store variety cannot be too severely condemned, as it is conducive to afterpain, sloughing and even suppuration, as has been demonstrated by animal experimentation. The most satisfactory distilling apparatus is one of glass of the sort devised by Dr. Silverman and others. The first portions of the distillate should always be rejected, as it contains dust and carbon dioxide accumulated in the still. If any doubt exists in the operator's mind as to the

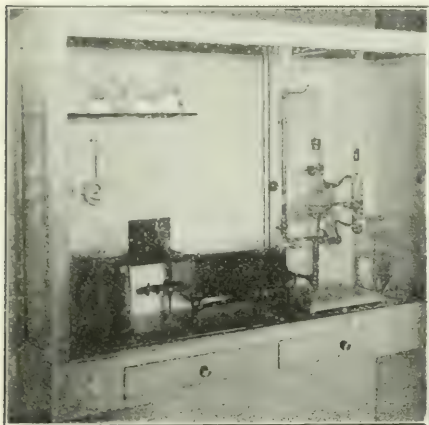


Fig. 3. Aseptic wall-cabinet for storing water-still instrument sterilizer, syringe jars, boiling cups and flasks of distilled, sterile water.

absolute purity of the distilled water used by him, he should subject it to the simple tests prescribed by the U. S. Pharmacopeia. The operator's stock of distilled water is to be kept in a double, ground-glass, stoppered, non-alkaline glass flask covered by a hood of sterile gauze. Ringer stock solution can be kept sterile for weeks in the non-alkaline glass stock bottle designed by the writer, and herewith illustrated, into which air is admitted only through a wad of sterile cotton held over the small holes in the stop-cock and intake which are brought into line by a turn only when Ringer solution is actually needed. It is good practice to renew Ringer solution every week, sterilizing it in a water-bath after removing stop-cock and nozzle hood and protecting the two outlets of the bottle with sterile cotton or gauze.

TOXICITY OF NOVOCAIN-SUPRARENIN SOLUTION

A great deal has been said and written about the toxic symptoms produced by novocain-suprarenin

solutions, and their appearance is usually, though wrongly, attributed to the admixture of suprarenin. Braun, and quite recently again Silverman, have conclusively shown that this toxicity is not due to the suprarenin but to the novocain itself. This is also borne out by the study of G. B. Roth, of the U. S. Public Health Service, who states that "*the depressing effect of novocain on the blood pressure and respiration of animals makes it necessary to use caution in its administration in clinical cases in which the blood pressure is low or in which the heart is at fault*," and that "*great care should be exercised in the injection of novocain subcutaneously, in order to avoid entrance into the circulation, thereby increasing its toxicity.*" In this connection it is advisable, however, to remember Mayo's timely warning that animal experimentation is not conclusive

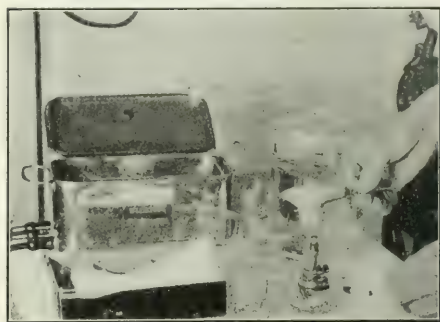


Fig. 4. Table and equipment devoted exclusively to the preparation of novocain-suprarenin solutions. Sterilizing solution in porcelain cup over an alcohol flame.

proof and that clinical observation in man alone can arrive at the truth which the test tube brigade can only distantly sight in their experiments on frogs, rats, cats and guinea-pigs. The writer's own clinical observations tend to emphasize the advantage of a tablet of a higher percentage of suprarenin in the dental tablet *E*, giving the stimulating effect of that drug, over the lower percentage in tablet *T*, except in hyper-thyroidism or patients with high blood pressure. The more pronounced and longer anemia produced by tablet *E* is of decided advantage to the oral surgeon in regard to better visibility of the field of operation. The disadvantage of this anemia as far as clot-formation and wound healing are concerned, are fully overcome by manipulation, massage or scarification of the wound ensuring a free flow of blood before completion of the operation.

Slow injection with just enough pressure to evacuate the syringe is the most efficient means for avoiding toxic symptoms which occur far more fre-

quently in the infiltration of small quantities of solutions under excessive pressure, than in the deposition of incomparably larger quantities under practically no pressure in conductive anesthesia.

Both the operator's and the patient's individualities determine to a large degree the character and intensity of toxic symptoms which accordingly may vary from slight pallor to syncope. Proper diag-

tion, patients who are to be subjected to local anesthesia should always be specifically advised to eat a hearty meal previous to presenting themselves for dental or surgical operations. This precaution, which is contrary to our methods of preparing patients for general anesthesia, will practically eradicate all tendency to faintness.

The usual symptoms of toxic effects in the vari-



Figs. 5-6. Right Tuberosity Injection.—The posterior and middle alveolar foramina, located back of the maxillary tuberosity, below and behind the zygoma, give passage to the posterior and middle superior alveolar nerves, innervating the soft tissues facially, the bone and pulps of the first second and third molars, and first and second bicuspids. The needle is inserted in the reflection of the mucous membrane back of the distal root of the first molar and advanced on the bony surface without discharging solution—in an upward, backward and inward direction. When the needle is inserted to full length, 3-4 of the contents of the syringe are discharged. If the bicuspids are also to be obtained the remaining 1-4 of the syringe contents is discharged as the needle is withdrawn. Patient's head in reclining posture; mouth closed, cheek retracted. Quantity of solution 2 cc.

nosis and selection of cases from physical, pathological, racial, social and psychic points of view are of paramount importance in the avoidance of untoward results. This phase of the question, which may be summed up in the word *shock*, has been treated in the writer's paper on "Anoci-Association in Dentistry," (Dental Cosmos, July, 1915), where the choice of anesthetic, pre-operative medication and therapeutic measures in collapse are discussed in detail, also in "Local Anesthesia in Dentistry" under the heading of "Accidents Following Novocain Injections." As a primary measure of precau-

ous types of patients may be briefly summed up as follows:

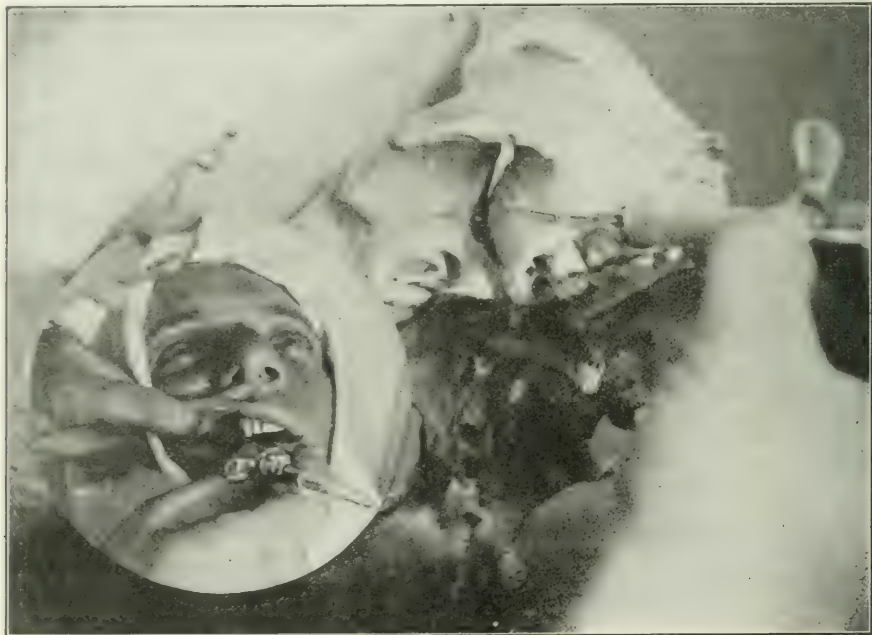
Weakly anemic patients are prone to pallor and slight trembling of the extremities, which passes off rapidly with deep breathing, or the internal administration of aromatic spirits of ammonia or camphorated valiolol, or upon the inhalation of strong ammonia or amyl nitrite, ethyl chlorid or ether. In *cardiacs*, distressing sensations in the heart region, shallow and rapid respiration and the appearance of perspiration on the forehead are noted, these symptoms quickly disappearing. The *bilious tempera-*

ments seem to be most pronouncedly affected, but in these also as well as in advanced stages of *nephritis*, slow injection of 1 per cent. solutions and the operator's reassuring attitude help the patient rapidly across the first five critical minutes within which toxic symptoms usually appear.

In persons with *high blood pressure*, the administration of mild narcotics previous to injection insures good results. Bromural "Knoll" (alpha-brom-isovaleryl-urea) 2 tablets equal 0.6 gram, to be taken with water 30 minutes before making the in-

jection, he has observed but two disconcerting reactions in neurotics.

Children seem practically immune to both 1 and 2 per cent. solutions, which, of course, is accounted for by the fact that usually the robust and healthy are the courageous ones who do not fear the needle, or that the operator by a few kind words striking the level of the childish mind gains the little patient's full confidence. It is remarkable indeed how devoid of any toxic reaction conductive anesthesia can be practiced on the children of the slums or in-



Figs. 7-8 Left Tuberosity Injection.

jection has given the writer greatest satisfaction, although other sedatives such as chloralhydrate, morphin in conjunction with scopolamin or hyoscin have their advantages.

In *neurotics* or *hysterics*, the problem is of course a much more complicated one, since we are dealing with psychopathic conditions, in the successful treatment of which the operator's personality in its appeal to the patient's psyche is a deciding factor.

Epileptics can be treated successfully if the operator will select the period half-way between the usually chronically occurring attacks. As a matter of gratification the writer wishes to state that in his clinical experience, including every imaginable *bad*

mates of asylums and tuberculosis institutions, whose physical condition is far below par.

Within 14 months of tri-weekly attendance as surgeon to the Department of Oral Surgery of the N. Y. Throat, Nose and Lung Hospital and to the German Hospital Dental Dispensary I have observed but one case of fainting in an undernourished and nervous girl of 15 years of age, faintness being due to unduly rapid injection and lasting but three minutes. Previous to that, I have had occasion to observe tendency of fainting in a hysterical young woman, Italian, 17 years of age, as Instructor in the Dental Department of the Medico-Chirurgical College of Philadelphia, and again as Instructor in the

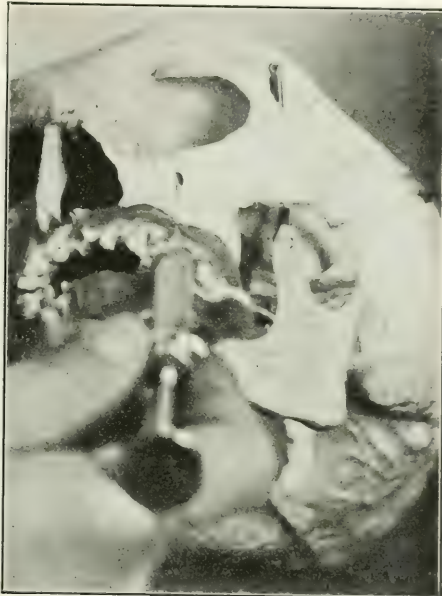
Post-Graduate School of Philadelphia in a man of 40 years who had made up his mind and signified his intention to faint.

INSTRUMENTARIUM

The necessity of asepsis of instrumentarium requires no special accentuation, although the lack thereof is one of, if not *the*, most common causes of afterpain and infections. Simplicity of instrumentarium engenders continuity of the delicate chain of asepsis, breaks in which are the more likely to occur the more complicated the apparatus used. All-

tra-indicated on account of their action upon novocain and the severe pain induced by the accidental subcutaneous injection of even minute quantities.

In the selection of needles, those of small lumen are preferable, as a stout needle manifestly is more liable to cause pain and traumatism on introduction. The extremely disagreeable accident of breaking a needle, which occurs most frequently in mandibular injections, is robbed of its terrors by the safety needles designed by the writer and herewith illustrated. These needles are constructed so that the



Figs. 9-10. Right and Left Infraorbital Injections. The infraorbital nerve innervates the soft tissues facially, the bone and pulps of the upper teeth. The middle superior alveolar branch the first bicuspid is also innervated by the infraorbital nerve. The needle is inserted in the infraorbital foramen. The advancing needle to about $\frac{1}{2}$ its length, while continually aspirating. Patient's head in reclining posture, mouth closed, upper lip retracted.

glass-and-metal syringes without washers of any kind permit of most simple and effective sterilization. The liquid most suitable for keeping sterilized syringes in is 70 per cent. alcohol with admixture of a small quantity of glycerin, which must be washed out from the inside of the barrel by drawing in it boiling distilled water several times to avoid the introduction of alcohol into the tissues and causing unduly prolonged anesthesia of the injected area due to the well-known action of alcohol on nerve tissues. Experiments with sterilizing fluids other than frequently renewed alcohol have proven unsatisfactory. Formaldehyd solutions especially are con-

break, if it occurs *in vivo*, comes to lie back of the safety disc, which prevents the fragment from disappearing in the tissues. Iridio-platinum needles seem most suitable for private practice, as they do not rust and are easily sterilized after every insertion by drawing through an alcohol flame, while steel needles clog unless a wire is inserted after every use; require at least 30 minutes' boiling to be sterile, and even then may rust and break anywhere along the course of the cannula. The sterilization of steel needles can be very quickly accomplished if instead of boiling, the needles are dipped in a vessel containing molten Wood's or Melotte's

metal. This method is based upon the argument that the needle is exposed practically to the heat of the flame in the absence of atmospheric air, thus preventing oxidation and loss of temper while destroying even the most virulent bacteria. The carrying of infections by needles from one part of the mouth to another or from mouth to mouth, is criminal negligence, and, it is to be hoped, of rare occurrence.

The syringe and safety needles designed and used by the writer have given him and a large number of practitioners full satisfaction.

METHODS OF CONDUCTIVE ANESTHESIA

Although various attempts have been made by operators and teachers to attach their name to modifications of the technic of conductive anesthesia, it should be emphasized that all these modifications have been foreseen by Braun upon whose painstaking researches conductive anesthesia is based. Since

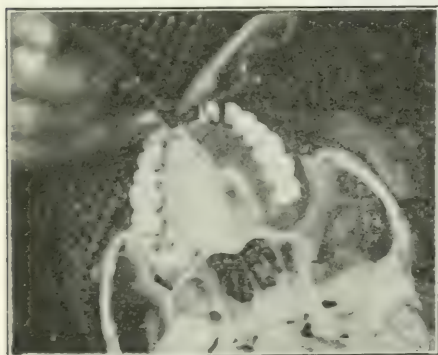


Fig. 1. Upper Anesthetic Injection. The anterior incisive foramen is located in the median line back of the incisive papilla and emits the naso-palatine nerve, innervating the soft tissues palatally from canine to canine. The needle is inserted a short distance anteriorly to the incisive papilla, injecting under light pressure, advancing cautiously and slowly to a short distance posteriorly. Patient's head in reclining posture; mouth wide open.

this basis is an anatomical one, there can be little variation or improvement over the basic principles established by Braun and adopted for dental practice by Fisher, Williger, Bunte, Moral, Seidel and others. It is feared that a confusion may arise in the beginner's mind as to specific merits of any one so-called method; in fact, the many questions addressed to the writer in that respect seem to indicate that the confusion has already started, which is surely not to the best interest of standardization which the dental profession is so eagerly striving to attain. The prime requisite for successful technic is a thorough familiarity with the anatomy of the head, and it is rather a slur upon the dental profession that certain *shot-gun* drugs are advertised

as requiring no special knowledge of dental anatomy for successful administration. Not only should this familiarity with the anatomy of the parts concerned be acquired from general and special textbooks, but practical experience on patients is paramount. Anatomic specimens are of great value, but better yet is the dissection of a green head after previous injection of some dye-stuff at the foramina concerned. In this manner the student becomes acquainted with the arrangement of the tissues upon which he is working.

ANESTHESIA OF THE UPPER BICUSPIDS.

Reports concerning the extent of anesthesia produced by tuberosity injection seem to vary as widely as the opinions of anatomists regarding the course of the superior middle alveolo-dental branch. This branch, if it exists—and some anatomists claim it does not—may present the following variations in course. It is either given off from the large infraorbital branch within the infraorbital canal and runs from there in the mucosa of the maxillary antrum to the upper bicuspid without appearing upon the facial surface of the maxillary bone; or it is inserted together with the posterior branch at the cribriform plate; or it is inserted in foramina situated anteriorly thereto. The examination of numerous skulls and clinical observations tend to point out that the latter two conditions are present in at least 75 per cent. of cases. If the long needle is inserted in the reflection of the mucous membrane back of the distal root of the first molar, in other words, between first and second molars, and advanced on the bony surface, without discharging solution in an upward, backward and inward direction at an angle of about 45° with the masticating surfaces of the upper molars, and 1½ c. c. of solution are injected when the needle has been introduced to full length; if then in slowly withdrawing 1 c. c. of solution is discharged as the needle is withdrawn, thus leaving a deposit of solution from the cribriform plate to the reflection of the mucous membrane; then, the three molars and two bicuspid together with the soft tissues connected therewith are satisfactorily anesthetized. It is of little practical value to argue how this anesthesia is obtained. Suffice it to say that either the posterior and middle branches are blocked simultaneously at the cribriform plate or, if the middle branch is inserted in its own foramina anteriorly to the cribriform plate, it is blocked there as the needle is withdrawn, or if the middle branch descends within the antrum, enough solution penetrates the canaliculi in the cortical facial bone to produce bicuspid anesthesia. If the first bicuspid is only partly anesthetized, as happens

in some cases, this is due to the anastomosing fibres of the anterior branch. Most operators seem to insert the needle too far posteriorly and at too obtuse an angle, thus getting way beyond the cribriform plate, and yet not deeply enough into the sphenomaxillary fissure to block the maxillary branch in toto. Stern's suggestion of using the long needle in the bayonet-shaped hub has not given any better satisfaction. In all cases where the operator attempts an injection at a very obtuse angle a great

tissues which may be sensitive to the passage of the needle are the mucosa and sub-mucosa. For the rest the needle should advance slowly through areolar, soft, fatty and connective tissues which have no sensory innervation. The mucosa and sub-mucosa are rendered insensitive, at the same time sterilized, by the topical application of the iodine-menthol-benzol mixture suggested by the writer (Iodin crystals, 10 parts; menthol crystals, 10 parts; benzenum U. S. P., 80 parts). This stable solution



Figs. 12-13. Left Posterior Palatine Injection. The posterior palatine foramen is located in the palate on a line joining the last molar teeth present; it emits the anterior palatine nerve the first bicuspid inclusive. The needle is inserted as for infiltration of the palatal root of the last molar, then advanced slightly toward the foramen, while discharging drops of solution. There is danger of going too deeply and directly into the foramen. The patient's head is in the reclining posture, mouth wide open. Quantity of solution 0.5 cc. or 1/2 contents of syringe.

deal of his solution seems to be deposited in the very heavy layer of areolar tissue overlying the cribriform plate and filling the sphenomaxillary fissure, so that very little solution is left for blocking the nerve branches. This will also explain the observation of some operators who obtain only partial anesthesia of the first molar.

PAIN DUE TO INJECTION

Any pain caused by the insertion of the needle is directly attributable to faulty technic. The only

will not produce the sloughing following the application of ordinary tincture of iodine which must be not older than one week, else it will decompose into hydriotic acid, while benzol will preserve iodine indefinitely. This iodine-menthol-benzol mixture is also a valuable indicator as to whether a patient is suitable for conductive anesthesia. Nervous patients and children who object and utter complaints upon application of this solution, which has a slightly smarting then cooling effect, are best subjected to a general anesthetic.

(To be continued.)

American Journal of Surgery

QUARTERLY SUPPLEMENT OF ANESTHESIA and ANALGESIA

Surgery Publishing Co.

J. MacDONALD, Jr., M.D., President and Treasurer
92 WILLIAM STREET - NEW YORK, U. S. A.

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F. HOFFER McMECHAN, A.M., M.D., Editor
Avon Lake, Ohio, U.S.A.

JULY	EDITORIALS.	1918
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ARE YOU DOING YOUR BIT?

While a large number of expert anesthetists have answered the Call to the Colors and are in active service at the Front or in the cantonment hospitals at home or in the training schools for medical officers, there is need for many more to enter the medico-military service. Surgeon General W. C. Gorgas is anxious to mobilize the allied professions in such a manner that no matter what the army or civilian needs may become they can be adequately met.

You have a place in this mobilization and the Editor of the Supplement, in cooperation with those in authority and in behalf of the Associations of Anesthetists, will do all in his power to assist you in doing your bit.

Do not let the fact that medico-military service will not be entirely devoted to the administration of anesthetics deter you from applying for and accepting a commission. Once in service you will find thousands of opportunities for being invaluable and opportunities for giving more anesthetics than you ever dreamed could be crowded into such brief periods of intense activity, will periodically arise. Unless all those competent to do this work offer their services many of the wounded will be deprived of the beneficence of anesthesia.

Those in authority have taken a very progressive step in according women physician anesthetists con-

tract service with the rank of Lieutenants. The patriotic women of the profession and its specialties deserve this recognition and there is not the slightest doubt of their making good.

At present an effort is being made to have those in authority recognize the dental anesthetist as fully competent to serve side by side with his fellows of the medical profession. The quota for the Dental Reserve Corps has been trebly oversubscribed and hundreds of other dentists are still anxious to enroll. Places can and, it is hoped, will be found to enable them all to do their bit.

It is interesting to note that after three and a half years of war and persistent urging by leading anesthetists, that the British army medical authorities have finally established a large training school for anesthetists. This school is located at a large military hospital in Buxton, England, and is in charge of Major Robson. Only medical officers are being trained in this special work.

At the Front it has been found that anesthesia is a specialty that demands all the resources of a full medical or dental course and a number of years training in the specialty. Presently the need for more anesthetists will require extended training and it is to be hoped that those in authority will solve the problem in the same manner as their British confreres. In so doing they will have the support of all concerned.

In the meantime the anesthetic resources of the country are being mobilized and if you can possibly serve in any way put yourself in touch with the Editor of the Supplement. If you are incapacitated for active service relieve some fellow anesthetist who can and will go. If you have to remain at home see to it that the hospitals in your vicinity do not suffer from lack of anesthetic service.

At the Present time there are many members of the medical and dental professions who wish to perfect themselves in the art of anesthesia and if you are competent to instruct put yourself at the disposal of the Associations of Anesthetists for this work.—McM.

THE INTERSTATE ASSOCIATION OF ANESTHETISTS WILL HOLD ITS FOURTH ANNUAL MEETING IN INDIANAPOLIS, INDIANA, SEPTEMBER 25-27, IN CONJUNCTION WITH THE INDIANA STATE MEDICAL ASSOCIATION, WHICH HAS ACCORDED IT THE COURTESY OF A JOINT-SESSION. ALL ACTIVITIES OF THE MEETING WILL CENTER IN THE HOTEL CLAYPOOL. AN INTERESTING AND INSTRUCTIVE SCIENTIFIC PROGRAM HAS BEEN ARRANGED. THE VISITING LADIES, AS USUAL, WILL BE DELIGHTFULLY ENTERTAINED. YOU ARE CORDIALLY INVITED TO ATTEND.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

INTERSTATE ASSOCIATION OF ANESTHETISTS.

The Interstate Association of Anesthetists will hold its Fourth Annual Meeting in Indianapolis, Ind., September 25-27, 1918, in conjunction with the Indiana State Medical Association. The activities of this meeting will be centered in the Hotel Claypool. The Indiana State Medical Association has accorded the Interstate Anesthetists the courtesy of a Joint-Session on the afternoon of September 26. A special Section on Anesthesia for Oral Surgery and Dentistry is also in preparation.

Among the special features of the program, the following may be announced in advance:

Some Clinical Observations on Nitrous Oxid in Cesarean Section and Operative Obstetrics and on the Depth of Anesthesia as Affecting the Mother, Child and Uterus, E. I. McKesson, M.D., Toledo, O. (Chairman's Address); Anesthesia in the Curriculum and Clinic, Willis D. Gatch, M.D., Indianapolis, Ind.; Ether Hypnosis in Psychotherapy, Frank R. Starkey, M.D., Detroit, Mich.; Etherization in the Therapy of Tuberculosis, Walter E. Savage, M.D., Cincinnati, O.; A Clinical Study of Blood Pressure, Pulse Pressure and Hemoglobin in Postoperative Shock, Hemorrhage and Cardiac Dilation, John O. Polak, M.D., Brooklyn, N. Y.; Warmed Chloroform-Ether Vapor Anesthesia in War Surgery, Francis E. Shipway, M.D., London, England, and M. S. Pembrey, Ph.D., Edinburgh, Scotland; What the Expert Anesthetist Should Be, A. S. McCormick, M.D., Akron, O.; Some Experimental Observations on Blood Changes Due to Anesthesia, W. E. Burge, M.D., Urbana, Ills.; Vapor Anesthesia for Oral and Facial Surgery, Wm. Hamilton Long, Louisville, Ky., and Some Recent Researches in the Physio-Pathology of Anesthesia, John A. Higgins, M.D., Chicago, Ills. Other papers are in preparation and will be announced on the completed program.

As usual the visiting ladies will be delightfully entertained and will be welcomed to the Annual Dinner. Those contemplating attending should make their hotel reservations early.

The following are the officers for the Fourth Annual Meeting: E. I. McKesson, M.D., Toledo, O., Chairman; John J. Buettner, M.D., Syracuse, N. Y., Vice-Chairman; F. H. McMechan, M.D., Avon Lake, Ohio, Secretary-Treasurer; and Members of the Executive Committee, Bion R. East, D.D.S., Detroit, Mich.; Weslev Bourne, M.D., Montreal, Canada; E. F. Horine, M.D., Louisville, Ky.; Thomas L. Dagg, M.D., Chicago, Ills.; E. M. Sanders, M.D., Nashville, Tenn., and Paul Cassidy, D.D.S., Cincinnati, O.

Those surgeons, specialists, anesthetists and dentists who are interested in the progress of anesthesia are cordially invited to attend.

For further particulars, membership, dues, and dinner reservations, address

F. H. McMECHAN, M.D., *Secretary*,
Avon Lake, Ohio.

AMERICAN ASSOCIATION OF ANESTHETISTS SIXTH ANNUAL MEETING.

The Sixth Annual Meeting of the American Association of Anesthetists was held in the South Parlor of the Auditorium Hotel, Chicago, Ill., June 10-11, 1918. Owing to the untimely death of Dr. F. W. Nagel of Montreal, Canada, early in the year, Acting President Albert H. Miller, M.D., of Providence, R. I., presided. In the absence of Capt. J. T. Gwathmey, M.R.C., in Paris, F. H. McMechan, M.D., Avon Lake, O., acted as Secretary.

During the executive session of the Association the Minutes of the 1917 meeting and the Secretary-Treasurer's report were accepted as read. The following officers were elected for the coming year:

President, Major W. B. Howell, M.D., C.A.M.C., Montreal, Canada; Vice-Presidents, Joseph E. Lunibard, M.D.,

New York City, and Myra E. Babcock, M.D., Detroit, Mich.; Secretary-Treasurer, F. H. McMechan, M.D., Avon Lake, Ohio; and Members of the Executive Committee, Harrington Marr, M.D., Nashville, Tenn., and John W. Seybold, M.D., Denver, Col.

The resignation of Capt. J. T. Gwathmey, M.R.C., as Secretary-Treasurer was very reluctantly received and accepted. Capt. Gwathmey fathered the organization of the American Association of Anesthetists at the A.M.A. meeting in Atlantic City, N. J., June 12, 1916, and acted as its first President at the Minneapolis meeting in 1913, after which he assumed direction of the association as Secretary-Treasurer. What success the A. A. A. has achieved has been due to Capt. Gwathmey's untiring efforts. Following a *viva voce* vote the Acting President appointed Drs. Seybold, McMechan and Miller, as a committee to express to Capt. Gwathmey the appreciation of the organization for his work in the past and to extend him the association's best wishes for the future. This committee was also empowered to extend to the wife and family of Dr. F. W. Nagel the association's sense of loss and bereavement on his sudden and deplorable death. Dr. Nagle was to have been the A. A. A.'s first Canadian President.

The association voted unanimously to extend its complete cooperation to the Surgeon Generals of the Army and Navy in perfecting the mobilization of the anesthetic service for medico-military preparedness, and the Secretary-Treasurer was empowered to use the funds of the association to circularize the anesthetists to secure any number of experts desired.

A discussion as to the time of meeting resulted in a decision to try out the policy of evening sessions again. It was suggested that at the next meeting complete information be placed in the hands of the A. M. A. information bureau for distribution to all in attendance.

W. F. Curran, M.D., Waco, Texas, and T. T. Church, M.D., Salem, Ohio, were elected to membership. The resignations of C. E. Boys, M.D., Kalamazoo, Mich., and Frederick J. Cotton, M.D., Boston, were accepted with regret. Other resignations were tabled and the association voted to remit the dues of those in service, and continue their membership.

During the two Scientific Sessions the following papers were presented and discussed:

The Anesthetist's Day's Work (Acting President's Address), Albert H. Miller, M.D., Providence, R. I.

Some Observations on Teaching the Pharmacology of Anesthetics, Torald Sollman, M.D., Cleveland, Ohio.

Accidents from Local Anesthetics—a Preliminary Report, Robert A. Hatcher, M.D., New York City.

The Operative Risk in Cardiac Disease, F. A. Willius, M.D., Rochester, Minn.

Blood Pressure as a Guide During Major Operations, Harold G. Giddings, M.D., Boston, Mass.

Recent Studies in Post-operative Pneumonitis, Allen O. Whipple, M.D., New York City.

Experiences of an Anesthetist at the Front, Major W. B. Howell, C.A.M.C., Montreal, Canada.

Deaths During and After Operations in Relation to the Surgeon, the Anesthetist and the Hazardous Risk, E. M. Sanders, M.D., Nashville, Tenn.

Nitrous Oxid-Oxygen Analgesia in Normal Labor and Operative Obstetrics, W. C. Danforth, M.D., Evanston, Ill. Combined Anesthesia for Cesarean Section, J. Clarence Webster, M.D., Chicago, Ill.

Gas-Oxygen Analgesia in Daily Practice, Will Walter, M.D., Evanston, Ill., and

The Prophylactic Use of Pituitrin for Hemorrhage in Nose and Throat Operations under General and Local Anesthesia, Samuel Salinger, M.D., Chicago, Ill.

As these papers will be printed in full in the Supplement there is no occasion to refer to them more fully in this brief report.

The Annual Dinner was served in the Auditorium Hotel and, considering the number of members in active service, was well attended and thoroughly enjoyed. A number of the visiting ladies lent grace and charm to the occasion.

Owing to the fact that experts in anesthesia are scarce in Chicago, and some of these were in service, the Clinics were not as numerous as might have been desired, but

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

AUGUST, 1918.

No. 8

SURGICAL TREATMENT OF RETINAL DETACHMENT.*

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NEW YORK CITY.

The treatment of retinal detachment is probably the most discouraging of all conditions which the ophthalmologist meets in his practice. So many procedures, both medical and surgical, have been advanced, only later to be discarded as of no value, that the profession at large has looked upon the condition as a hopeless, incurable one. Only perfunctory treatment, if any, has been given to the majority of these cases which are of such serious import to the vision of the patient.

Vail of Cincinnati in a most comprehensive paper published in the *Annals of Ophthalmology*, 1913, bears quotation in this connection. His paper was based on replies received from 281 oculists, 250 representing, according to the author's estimate, an average of twenty years practice, and an experience averaging five cases a year, or about 25,000 cases in all, with the employment of every known line of treatment "and not a single case of permanent cure in the lot." On the other hand, thirty-one oculists secured cures; twenty-five each had a single cure; four secured two cures, and two, four cures, making in all forty one patients reported as cured. Two of these patients had detachments due to albuminuria in pregnancy and they were cured after abortion. They should not be counted, as treatment is not applicable except in these unusual circumstances. This leaves thirty-nine cures. In about one-half of this number the cure is not convincing from the records submitted, leaving say twenty cases, or less than one case in every 1,000 cases as a possible cure. Vail, considers that these figures show conclusively that there is no proper treatment for this condition.

Medical treatment involved rest in bed, pilocarpin sweats, subconjunctival injections of citrate of soda, according to the method of Fischer, or subconjunctival injections of other drugs, as salines, dionin,

mercury, etc. All these measures have been abandoned by the progressive oculist and whatever hope can be had for a re-attachment is based upon surgical operation. However, it is always wise for the ophthalmologist to investigate the general condition of his patient, paying particular attention to the blood, urine and toxic elements which cause detachments by setting up a serous choroiditis. This, in the author's opinion, explains many so-called cases of idiopathic detachments and probably some of those due to the myopia, a condition wherein which detachment is common and only awaits an exciting cause. Retinal detachment has been reported due to pyorrhea alveolaris, to diseased tonsils and sinus involvement, also to intestinal toxemia, probably due to toxins floating in the blood or lymph that exercise a selective action on the choroid causing an exudation of serum with resulting detachment of the retina. The removal of this sub-retinal fluid and the adhesion of the area of the detachment to the choroid is the end that is sought and that seems only possible through surgical intervention.

The first rational operation for retinal detachment was a simple puncture of the sclera, which, according to Casey Wood, was first practiced by James Ware in 1805, and it was probably the favorite operation of the majority of eye surgeons until the introduction of scleral trephining. This operation aimed simply at the evacuation of the sub-retinal fluid. In 1863 von Graefe practiced an incision of the detached retina so as to allow the fluid to escape more freely. This was also done by Bowman. Later de Wecker devised a trocar to be used in tapping the sub-retinal sac; and Galewowski aspirated or suggested aspiration of the postretinal fluid with a modified Dieulafoi syringe. In 1871 Meyer endeavored to pass a suture through the retina and drew it fast to the sclera. In 1882 de Wecker and Masselon employed a galvano-cautery, which was thrust completely through the sclera. This form of treatment was intended to bring about an adhesive inflammation between the choroid and the replaced retina. In 1886 Fano proposed that an irritant fluid be injected into the sac to set up an adhesive inflammation and in 1890 Scholer reported twenty-six cases in which he had made injections of a few drops of iodine into the posterior chamber. In 1895 Deutschmann proposed

*Read before The Academy of Medicine of Northern New Jersey, March 25th, 1918.

the scleral button, which was intended to apply to acute cases as well as to those more advanced in which a certain amount of permanent shrinkage of the retina had taken place. This operation evacuates the sub-retinal fluid, divides the retina and allows it to fall back, and, according to the author, produces small inflammatory or exudative adhesions between the choroid and retina. He further injected animal vitreous into the vitreous cavity, so as to press the retina back into place. In 1903 Muller advocated resection of a portion of the scleral wall, so as to secure permanent drainage.

Holth, at the 27th meeting of the Ophthalmological Society in 1913, reported six cases of retinal detachment in which the sclera was trephined without evacuating the sub-retinal fluid. He reported a temporary favorable effect in all, and a permanent favorable effect in four instances. Holth credits the technic of the operation to Argyll-Robertson in 1874, although he says it was done at that time for glaucoma absolutum. Holth used a two and one-half millimeter trephine, and raised a flap of conjunctiva and episcleral tissue, after which a scleral button was removed and the flap sutured into place without injuring the choroid.

In 1913, Holth reported further that he had observed the eyes already operated on and had performed the same operation on a number of other eyes. In eleven cases in which retinal rents existed, no permanent improvement was secured, but in five cases where there were retinal rents, the retina became completely re-attached. In Holth's opinion the prognosis is most favorable in the flat detachments where a tear most readily can be excluded.

Walter R. Parker reported a successful case. He trephined the sclera and incised the choroid and retina. "The operation was followed by a free discharge of a straw colored fluid and a small amount of vitreous." It must, however, be stated that in this case a double neuro-retinitis existed, and it is possible, when an inflammatory condition of this nature exists, that the type of case is not so serious as in the ordinary spontaneous detachment. At the June meeting of the American Medical Association, Parker reported eleven cases, with three very good results. The histories are given in detail, and the results are summarized as follows: Vision improved, four; unimproved, five; made worse, two. Fields improved, eight; made worse three. Parker almost invariably incises the choroid, or the choroid and retina, with a cataract knife, allowing a few drops of vitreous to escape.

Dr. Edgar S. Thomson, with whom the author has been associated in hospital work for many years,

has collaborated in a series of cases covering a period of five years. We employed for the medical treatment of retinal detachment rest in bed, recumbent position for weeks in conjunction with diaphoresis by pilocarpin injections; subconjunctival injections of citrate of soda, saline, dionin, cyanide of mercury, but without results of value. Scleral puncture also was resorted to, twice with temporary relief. Later, in two cases, aspiration of the sub-retinal fluid without trephine opening was performed but this was quickly abandoned on account of the traumatism produced on the eyeball in pushing the needle through the tough, resilient, unyielding sclera.

In September of 1914, Dr. Edgar S. Thomson and I conceived of the trephining operation with a simultaneous or subsequent aspiration of the sub-retinal fluid. The idea was to secure drainage over a prolonged period of time, and to remove the fluid with as little traumatism as possible, so as to avoid having any inflammatory tissue around the scleral opening which might subsequently block it up. It is, of course, not definitely known whether a trephine opening will remain free indefinitely or not, but, according to Elliot's experience in trephining for glaucoma, the evidence seems to indicate that the opening will remain free for months, perhaps even for years, and as far as the treatment for detachment is concerned, this has its obvious advantage.

The technic followed in thirteen instances, as reported by us at the meeting of the American Medical Association, 1915, was practically the same as Holth's, as far as the removal of the scleral button is concerned. Holth, however, considers that it is proper at times to enlarge the scleral opening with scissors. We do not interfere with the scleral opening in any way whatsoever, for the reasons already given. A scleral button is removed with the slightest possible traumatism, as nearly over the center of the detachment as possible. If suprachoroidal fluid escapes in any great quantity, and the ophthalmoscope shows that the detachment has gone down, the conjunctival flap is replaced and nothing further is done for the time being. If little suprachoroidal fluid escapes, the needle of an aspirating syringe is carefully pushed through the choroid and as much fluid as possible is aspirated. The conjunctival flap is then sutured into place and the operation terminated. If no aspiration has been done at the time of the trephine operation, it is done about ten days later when the reaction has completely subsided. A small aspirating needle is passed through the conjunctiva, the scleral opening and choroid and

as much of the fluid as possible is withdrawn. This operation can be repeated if necessary, as it is followed by almost no reaction, and, as before stated, it accomplishes the removal of the fluid with the least possible traumatism of the choroid in the trephine opening. We feel that any escape of the vitreous, or wounding of the retina, is undesirable, as such a condition must certainly lead to adhesions and more or less blocking up of the permanent filtration.

The trephine opening should be made over the site of the detachment and as far back as possible on the globe, consistent with a good working field. Most detachments are found in the lower field, although we have operated on some in the upper quadrant.

Frequently a detachment in the upper part of the field will subside, leaving the retina over the site of the old detachment apparently re-attached, and the fluid will gravitate to the most dependent position—the lower part of the eyeball. It seems wiser, therefore, to select as the site of the operation, the most dependent position possible which is within the area of the detachment, and this will usually be a point equidistant from the external and the inferior recti muscles, or a corresponding point between the internal and inferior recti. The trephine opening should be made as far back as possible, and this is more easily accomplished when the operation can be done between the external and the inferior recti-muscles than on the opposite side. No speculum is necessary. An assistant inserts a strabismus hook and retracts the lower lid and tissues of the external canthus. A curved incision is made through the conjunctiva, the convexity in the direction of the cornea, and the tissues are taken up down to the sclera. It is wiser at this juncture to put a single silk suture at the summit of the flap, as otherwise the capsular tissue underneath the flap is apt to be rolled up and the ultimate flap will then be composed of nothing but conjunctiva, leaving more or less thickening and adhesions in the episcleral tissues, which tend to seal up the trephine opening. The entire thickness of tissues is taken up down as far as the sclera, and dissected well back. The assistant then holds this flap back by means of the suture. The trephine opening is then made with a 2 or 3 mm. trephine (a special trephine). On the removal of the trephine button, there is in many instances, a gush of serous fluid from the supra-choroidal space. Examination of the eye usually shows considerable subsidence of the detachment after this fluid has escaped. The flap is then sutured into place, the eye bandaged and the patient put to bed.

The pupil should be well dilated with atropin before the operation, both for the purpose of examination and to keep it as free as possible from the tendency to inflammation. There is usually very slight reaction after the trephine operation. The sub-retinal fluid is then forcibly aspirated (Record Syringe), after which the patient is put to bed for a day or two as circumstances require. The aspiration operation is followed by practically no reaction and can be repeated as long as the trephine opening remains free. In this connection, it is very important that the flap be properly made, as, if the capsular tags are allowed to roll under the flap, it is difficult to see where the opening lies. If the conjunctival flap heals properly, the trephine opening shows as a small dark spot, which is easily identified. It does not, however, show so plainly as a trephine opening at the corneal margin, on account of the greater thickness of the conjunctival and capsular tissues of the flap. In some cases presented, a single aspiration was sufficient, but in others there was re-accumulation of the fluid and the aspiration was repeated.

It is evident that this procedure, in order to be successful, must be undertaken before the detachment is old enough to have undergone degenerative changes. A shrunken and contracted retina will, of course, not fall back into position, even if the fluid be withdrawn; nor is there any probability of success if inflammatory changes have set in, especially if the intra-ocular tension has fallen below normal.

It is, also, hardly conceivable that the operation would be successful in a high degree of myopia, although on this point experience is lacking. The indication for the operation, however, is in recent traumatic or spontaneous detachments where there seems a likelihood that the fluid accumulation serves to continue the condition.

REPORT OF CASES.

Case 1. B. a bookkeeper, aged 21 years. Family history negative. September 22, 1914, he noticed a blurring in the sight of the left eye. Sept. 26 he visited a hospital but did not receive any treatment. He visited me, October 1st. There was no history of any trauma. Urinalysis, Wassermann test and von Pirquet test negative. Blood pressure 128. R. V., 20/40. L. V., hand movements in the lower and outer fields. There was low myopia in each eye. The retina was bluish white and thrown into folds with loss of the light reflex of the vessels. The disc was still visible, but the detachment extended nearly to the macular region. There were a few floating opacities in the vitreous. He entered the Manhattan Eye, Ear and Throat Hospital, Oct. 2nd, and was put to bed, pupil dilated with atropin, and pressure bandage applied. Pilocarpin sweats were given every second day. Oct. 12, no

operation being operated. Under the trephine 2 mm. in diameter, was removed by the trephine and from under a conjunctival flap over the site of the detachment and as far back as possible between the inferior and external recti muscles. The choroid and retina were not punctured. The conjunctival flap was united by two silk sutures and a moderate pressure bandage applied. He continued in bed until Oct. 22nd, having had but a moderate amount of reaction. On that date, a medium-sized aspirating syringe was pushed through the conjunctiva and scleral opening and choroid, and 25 minims of serous fluid was withdrawn. The fundus of the eye was immediately examined and the retina was seen to have fallen back into place. The vision on the following day was "fingers at 8 feet." The vision gradually increased, on Dec. 22nd vision in the left eye was 20/30. January 27th, 1916, the left lens was increased to a minus 1.50 cyl. which gave him vision of 20/20. This case was shown before the Academy of Medicine, first shortly after the operation, again at the end of one year and again at the end of two years. I saw him about one month ago and his vision still remains 20/20 with correction.

Case No. 2. Mr. W. B., age 62 years, by occupation a clerk in the Assay office of the U. S. Mint. For a time he tells me he was exposed to intense heat in the melting of gold in the crucibles.

He first came to my office on Sept. 14th, 1916, and gave the following history: He had lost the vision of his left eye six years before from a condition which he was told was retinal detachment. The condition was rather acute, the vision being lost within a period of a few months. The vision in his right eye remained good until the early part of July, 1916, when it suddenly failed. As he described it, a film came in front of the eye, more markedly above and to the nasal side. He had been examined for glasses about a month previously by an optometrist and was told that the vision in this eye was normal. He was under treatment from July until Sept. 4th by the use of medicine and drops, but his vision gradually failed so that he had to be led into my office on September 14; his vision being fingers at two feet in the lower field with correction on. Vision in the left eye was light perception in the lower and outer fields.

Family history excellent. His personal history was that he had never been seriously ill in his life. He smokes moderately; has never used alcohol. Teeth normal. Stomach and bowels normal. A series of urine examinations shows his urine to be of low specific gravity with traces of albumin and occasional granular and hyaline casts although in some specimens none were found. A urine typical of a chronic interstitial nephritis. Wassermann test was negative. Blood pressure, systolic 180. Diastolic 110.

He was treated by subconjunctival injections of 2% sodium citrate with instillations of atropin and dionin in the eye, rest in bed and a moderate pressure bandage without any good result.

An ophthalmoscopic examination of the eye showed a flat detachment of the entire lower por-

tion of the fundus with some floating bodies in the vitreous. Disc looked paler than normal, vessels, both arteries and veins more contracted. Fields could not be taken.

On Oct. 7th, he was operated on at the Manhattan Eye, Ear and Throat Hospital. The usual scleral button being removed with immediate aspiration, 15 minims of clear yellowish fluid was removed. Oct. 8th, the patient remarked that his vision had improved wonderfully and a few days later he was able to see through the door of his room out into the hall and could count fingers at 8 feet.

Examination of the fundus showed a re-attachment of the retina and the tension of the eye, which, following the operation was markedly minus, gradually increased until it was normal on Oct. 30th when he left the hospital. His vision then being 20/200 without correction and with a plus 2.50 cyl. ax. 90 was 20/100 plus 1. He could read a Jaeger No. 10 with a plus 2.00 sph. added to his distance correction.

The condition to-day is absolute re-attachment of the retina, still considerable floating opacities in the vitreous which probably accounts for the low vision. Fields are moderately contracted both for white and colors.

In all about 70 patients have been operated upon by this method. The most of them suffered from long standing and nearly complete detachment and no result from the operation was expected. Some gave early promise of complete cure, only to re-detach later. Many were benefited as to field and vision, although the sub-retinal fluid could not be entirely withdrawn. Vitreous hemorrhage occurred once following a secondary aspiration, probably as a result of opening a choroidal vessel.

This, however, was the only instance in which this complication occurred. Not a single eye had to be enucleated as the result of the operation, so that we regard the operation as entirely safe, with reference to the integrity of the eyeball. Six patients are regarded as cured, having given evidence of the fulfillment of the three requirements: 1. complete reattachment; 2. restoration of vision and fields; 3. with a duration of one year. My first patient operated upon in October, 1914, has 20/40 without correction brought up with lenses to 20/20 with normal fields for white and colors.

In conclusion, to quote the words of Roemer; "The treatment of detachment of the retina is one of the most thankless and unsatisfactory duties we have to perform in ophthalmology." Taking into consideration the statistics compiled by Vail, the results obtained by this new operative procedure of scleral trephining with aspiration, show an encouraging increase over those secured by any of the older methods. As we feel that there is no danger as to the loss of the eye itself, and as in

none of our cases has the vision been lowered, we would urge the adoption of the procedure, particularly when small or moderate detachments are found early and when all of the sub-retinal fluid can be removed. We would also urge upon the profession an investigation into the etiological factor and the proper medical treatment to be instituted in conjunction with the operation.

391 EAST 149TH STREET.

A CASE OF SPONTANEOUS CURE OF FEMORAL ANEURYSM.

ROBERT C. BRYAN, M. D., F. A. C. S.
RICHMOND, VA.

The femoral artery courses down the anterior aspect of the thigh, its origin being immediately behind Poupart's ligament and midway between the anterior superior spine of the ilium and the symphysis pubis. It is covered by the skin and superficial fascia, superficial inguinal lymphatic glands and iliac portion of the transversalis fascia, which forms the anterior part of the sheath of the vessel. Posteriorly it lies upon the psoas muscle, which separates it from the capsular ligament of the head of the hip-joint. This artery is two inches in length and may be readily located by the palpating finger.

By virtue of its superficial position, injury to the femoral artery is not infrequent.

Le Dentu, A. and Delbert, Pierre, *Traite de chirurgie clinique et operatoire*. Paris, 1897, on page 234, in discussion of femoral aneurysm, say: "These aneurysms, like all others, increase progressively in size and tend towards rupture, but their progress is, perhaps, less rapid than that of popliteal aneurysm and cases of spontaneous recovery have been observed. But this is too rare an occurrence to be taken into account in considering the prognosis. Though these aneurysms are not so serious as those of the popliteal space it is no less true that they should be treated as soon as they are recognized."

Joseph D. and Buck, Albert H. *American Practice of Surgery*, New York, 1910, state "In the early stages, while the sac is small, the contents consist of fluid blood only. Later, when the sac increases in size, particularly in the sacculated variety, layers of fibrin are deposited upon the walls, the outer and older layers being dry, firm and yellowish-white in color, the inner and younger soft, friable and red. Nature rarely makes an effort to organize this clot, neither living cells nor vessels being present; the tendency is rather toward degeneration. In the outermost layers granular and fatty changes are

found, and often irregular cavities, filled with atheromatous material.

The artery from which a true aneurysm springs is generally the seat of chronic arthritis. The collateral arteries are dilated in proportion to the obstruction offered to the blood current in the main vessel. The satellite veins are compressed and sometimes thrombosed.

A spontaneous cure is extremely rare. It may be due to gradual filling of the sac with layers of fibrin; to coagulation of blood within the sac, the result of lodgment of an embolus above or below the mouth, this embolus being perhaps derived from the an-



FIG. 1. Location of aneurysm, anterior aspect of the right thigh.

eurysm; to the inflammation of the sac; or to rupture and subsequent cicatrization. An aneurysm cured by nature shrinks somewhat and becomes solid and may in time be represented by a mass of fibrous tissue. Preservation of the lumen of the artery, which is possible in the spontaneous cure of a saccular aneurysm, is rare."

In the *American Text Book of Surgery*; William W. Keen and J. William White, Philadelphia, 1892, the following is found:

"The spontaneous cure of aneurysm is occasionally effected by nature, unaided by the surgeon. Such a case occurs very seldom, but that a cure under certain conditions may thus be brought about is no longer open to dispute. In the cases of spontaneous cure the aneurysm has always been found solid and firm—which leads to the belief that a deposition of fibrin has already taken place. A deposition of fibrin takes place in consequence of the slower current in the sac and finally fills it. The

clot thus formed within the sac may extend into the vessel and thus add to the permanence of the cure. Occasionally the aneurysm is spontaneously cured by an embolus, when a clot is washed out of the sac into the efferent artery and occludes it, so that the current is completely arrested within the sac; the latter then fills with a firm coagulum. Sometimes a spontaneous cure is effected when the sac becomes large enough by its own weight to cause mechanical pressure upon the artery sufficient to retard, or even to arrest, the circulation in the vessel. Finally, a spontaneous cure is effected in some cases when the sac becomes acutely inflamed and the coagulation of the blood within it is thereby promoted."

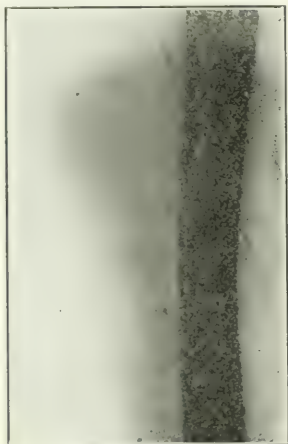


Fig. 1. A. R. View.

Charters J. Traumatic and Arterio-venous aneurysms. *Lancet*, 1917, I, 576-577.

At a meeting of the Medical Society of London in a discussion of aneurysms Col. Symonds said, "that gangrene was a serious danger in operating on the common femoral; in the South African war it occurred in 50 per cent according to Makins. In aneurysms below the middle of Hunter's canal his experience was that gangrene did not follow ligation of the vessels. With regard to arterio-venous aneurysms Sir George Makins was strongly of the opinion that these should be left for two or three months to consolidate and contract and to permit the establishment of a collateral circulation. But Col. Symonds thought it wiser to operate on them early, thus avoiding the trouble due to adhesions which followed passive waiting.

Maj. W. McAdam Eccles thought that in aneurysm of the neck the sooner one operated the

better; but when the situation was one of the limbs it was right to wait for collateral circulation to be established. So far he had not had a case of gangrene of the lower limbs because he had waited for months in these cases.

Capt. J. R. Lee agreed as to the wisdom of waiting in aneurysm of the limbs. He did not agree with leaving the sac, as there was evidence that it was apt to become canalized."

Cure by digital compression—Case I. Sawtelle, Henry W. Femoral Aneurysm beginning immediately under Poupart's ligament treated by digital compression, *N. Y. Med. Jour.*, 1895, lxi, 225-227.

Patient, sailor, 28; aneurysm first made its appearance after a hard night's work at the wheel in

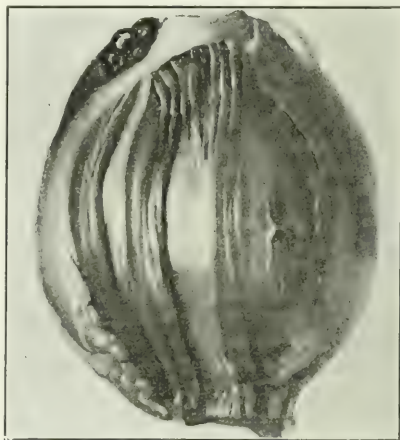


Fig. 2. Anterior view of the removed aneurysm, fibers of the sac thus arising from above (toward artery).

a heavy sea about 16 months before he came for treatment. While at the wheel he had to stand in such a position that he had to brace himself with his left leg, subjecting it to considerable strain. Digital compression was applied and after two hours pulsation stopped in the tumor, but compression was kept up for 41 hours longer. Oct. 27th, after three weeks in bed, allowed to get up, discharged Oct. 29th, at which time the tumor was found about half its former size and the clot appeared to be thoroughly organized. No pulsation of femoral, popliteal or tibial arteries could be detected, but the collateral circulation was thoroughly established, as evidenced by the warmth and absence of edema and full usefulness of the limb.

Case II. Hard, A. D. An interesting case of femoral aneurysm cured by digital compression. *Phys. and Surg., Ann Arbor, Mich.*, 1883, v. 494.

Capt. W., 38; well marked aneurysmal tumor of femoral region extending from inguinal furrow to within four inches of knee. History of severe wrench of thigh three years previously while march-

ing, which was attended by sharp, stichy pain in right groin and followed by throbbing lump about size of chestnut, which has steadily increased in size. Digital compression for 60 hours; followed by tourniquet for 36 hours. During this time tumor decreased in size about one-third, pulsation had completely ceased and the solidity of it resembled a fibroma. Subcutaneous injections of ergotin, three grains to an ounce, were given very three hours, for the purpose of delaying complete collateral circulation, and so favoring clot formation in the aneurysmal sac; notwithstanding this compression below the tumor was necessary during the last 24 hours.

Case III. Mac Cormac, W. Aneurysm of the Femoral Artery in Hunter's Canal; Digital compression for 24 hours; cure. *Lancet*, 1883, I. 405.

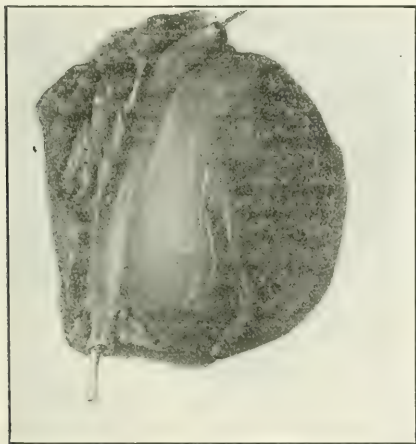


Fig. 4.—Posterior view of the aneurysm, probe in the afferent and efferent stems.



Fig. 5.—Sac opened up, shows concentric laminations of fibrin deposit.

China packer, 29; admitted Dec. 5, 1882. In 1874, chance followed by rash. About year before admission health gave way and he was advised to go to bed for heart disease; had been in bed since. About month before admission noticed small pulsating swelling in lower part of left thigh. On examination tumor found in lower third of Hunter's canal; distensile pulsation well marked; well marked bruit conducted down to calf. Leg warm and pulsation of posterior tibial could be felt. Arteries thickened; pulse 89, collapsing. Put to bed on low diet for a few days and pulse fell to 80. Digital compression maintained by relays of students. Compression begun at 8:30 A. M., Dec. 12th. At midnight sac nearly filled with clot and the pulsation considerably diminished. Still some pulsation to be felt in posterior tibial. Next day at 10 A. M. tumor quite solid; no pulsation in sac or tibial artery; limb warm. Compression discontinued. Patient felt well. Several anastomosing vessels visibly pulsed around knee. On 16th patient well, limb warm; no return of pulsation in tumor which was much more solid. 21st. Pulsation could be felt for

first time in posterior tibial; no return in sac. Patient got up Jan. 5th. The sac had contracted to one-third its former size, became quite hard and gave the patient no inconvenience.

Cure by Pressure—Brown, Buckminster. Femoral Aneurysm cured by direct compression while the patient was taking active exercise; death from peritonitis 6 years afterwards. *Bost. Medical and Surgical Journal*, 1875, xciii, 461-469.

Man 38; for 10 days had noticed throbbing in right groin, which was found to be femoral aneurysm. (Cause not given). Aneurysm fusiform and involved all coats of artery. Situated just beneath Poupart's ligament. Describes detail of pressure treatment, at first with bags of shot and cannon balls, later with a leather belt with a strap at-

tached passing over the aneurysm. The patient was on his back ten months and under treatment between sixteen and seventeen months. Died six years later of peritonitis which had no connection with aneurysm. On autopsy a colored wax injection was thrown into the common iliac artery. There is an illustrative plate which shows that it entered the thigh by the internal iliac artery, its branches and their anastomoses. The aneurysm was found to be fusiform and caused by a gradual expansion of the common and superficial femoral arteries, commencing directly under Poupart's ligament and increasing until its diameter measured two inches; it then gradually diminished until its caliber corresponded with that of the superficial femoral, the long axis of the tumor measuring $2\frac{1}{2}$ inches. The three coats of the artery could not be satisfactorily demonstrated owing to their consolidation by the long continued compression. The cavity was completely filled by a mass of clot, somewhat adherent to, but easily separated from its walls. It showed no appearance of lamination on section, but instead a firmly condensed tissue irregularly distributed

throughout the friable portion, and inclosing the latter in small cavities. The former predominated and under microscope showed some signs of organization. The communication between the ends of the aneurysm and the artery was entirely closed. There was no communication between the aneurysm and the deep femoral. The femoral vein had been completely closed. The first half inch of the external iliac artery was filled with the injecting material; beyond that point the vessel had dwindled to the usual size of the circumflex iliac; found that fine probe passed downward for about half inch; below that it was apparently solid. The superficial femoral was empty, and a probe entered five inches below the aneurysm passed readily to within an inch of the latter, but there it met a solid body (the occluded vessel) and would not enter the aneurysm. The internal iliac and its anastomosing branches were very much enlarged, the caliber of the vessels varying from twice to three or four times their natural size. The main blood supply to the limb came from the gluteal, sciatic and obturator arteries. Gives anatomical details of the anastomoses. During life the patient has at times had intense pain in the sciatic nerve, and this was explained by finding the nutrient vessels of the nerve very much enlarged.

Cure by Tourniquet—Beach W. A. A. Case of Femoral Aneurysm cured without operation. *Medical Recorder*, 1824, vii, 53-54.

Woman of 50 had very large femoral aneurysm. Below the knee along the course of the artery there was but little circulation, which produced a continual sensation of numbness. The tumor looked as if it would soon burst; it was accompanied by great pain and fever. Advised amputation which patient refused. Applied tourniquet and pursued rigid antiphlogistic course of treatment, both general and local. Cupped tumor and extracted some blood from below the knee; about 10 oz. The whole leg was bathed in salt water and covered with bruised stramonium leaves. In about six weeks patient was able to walk and soon after took up her usual work. Is now in good health. The author is confident that the aneurysmal sac was filled with coagulated blood, and that the circulation had stopped, being carried on subsequently by the anastomosing branches. Thinks an operation would unquestionably have proved fatal.

No information given as to the cause of the aneurysm.

Cure by Ligation of External Iliac—Cooper, Sir Astley. Case of Femoral Aneurysm for which the External Iliac Artery was Tied. *Guy's Hosp. Reports*, 1836, I, 43-50.

This is a case of ligation. The patient died 18½ years after the operation.

Spontaneous Cure—Case I. Holmes, T. On the Surgical Treatment of Aneurysm in its Various Forms. *Lancet*, 1874, ii, 37; 74; 297; 336; 507; 543; 825; 859. The lectures on pp. 336 and 507 are on femoral aneurysm, and a number of cases are quoted from the literature showing spontaneous recovery or recovery under compression; but the state of the circulation is not described. In one case of Beau-

mont's abstracted from the *Medical Times and Gaz.* of July 17, 1867, a case of traumatic femoral arterio-venous aneurysm, he says that the sac was ossified and that the femoral vein was so filled with coagula that the profunda vein became so compressed as hardly to transmit any blood, the anastomosing veins, with the saphena, had so completely carried on the circulation that there was not only no gangrene, but no edema of the limb.

Case II. Crisp, Edwards. A Treatise on the Structure, Disease and Injuries of the Blood Vessels. Lond., 1874. Gives a table of 551 cases of aneurysm collected from the literature. Of these only one (that of Mr. E. Home) was spontaneous recovery of a femoral aneurysm.

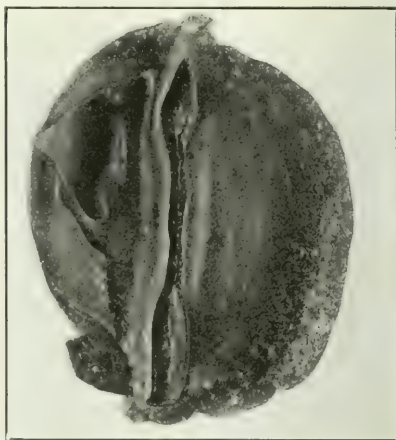


Fig. 6.—Complete obliteration of the artery for the middle one-half of its extent between the upper and lower pole of the aneurysm.

Case III. Luke, J. A case of Tubular Aneurysm undergoing Spontaneous Cure. *Medical Gazette*, 1845, L, 78-82.

Dock laborer, 31; had oblong pulsating tumor of thigh extending from Poupart's ligament down the thigh between three and four inches in the direction and situation of the femoral artery. Had first noticed it about a year before. Thinks it must have been due to lifting heavy weights. Thinks it has not increased in size since first discovered. Thought nothing of it for six months, when, on running, he was suddenly seized with cramp of the muscles of the thigh and calf and pain in the groin. On putting his hand to the tumor found it pulsed more violently than usual. Author applied piece of adhesive plaster on leather, and over it a spica bandage. Left it on from March 3rd to March 8th. On removal the tumor had become hard and unyielding, and pulsation had ceased in all arterial trunks of the limb. On the 22nd of March the tumor was still hard and consolidated and without any pulsation. There was apparently an obliteration of its cavity, the contents of which had undergone some diminution from absorption. Patient allowed out of bed. April 2nd. walks about with greater ease and free-

dom than when admitted, but still with pain in calf. April 19th., returned to hospital for observation. Complaints of pain in calf; numbness of foot at times; circulation apparently restored sufficiently for proper nourishment of the limb, but pulsation has not returned in any of the arterial trunks. Size of tumor decreased considerably, and aneurysm undoubtedly cured.

Arthur further discusses cause of consolidation of aneurysm in these circumstances. Thinks it is not entirely due to blood clotting, but, partially at least to plastic action on part of wall of sac.

Case IV. Spaulding, Lyman. Case of Aneurysm Cured by Spontaneous Concretion of the Sides of the Artery. Medical Repository, 1810, i, 348-353.

Man aged 65, in April 1804 first noticed swelling about the middle of left thigh on course of femoral artery, nearly size of hen's egg. In November 1806

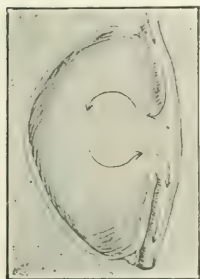


Fig. 7.—Schematic presentation of the original aneurysm.

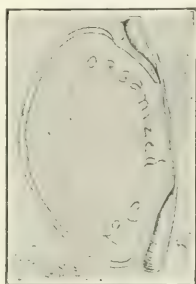


Fig. 8.—Obliteration of the lumen of the artery by the organized clot.

first noticed pulsation in the tumor, which was much increased by violent exercise, and in January 1807 noticed coldness and numbness down inside of knee to foot. In September 1807 he applied a bandage himself; tumor had increased to size of man's fist and pulsation was very strong. In January 1808 pulsation so strong as to be perceptible through clothes. He again applied a bandage, but on second day pain compelled him to remove it. On its removal the pulsation stopped and was never again perceptible. Coldness and numbness were now increased and continued till operation when they subsided. On the 25th of March tumor became painful and inflamed. On April 6th operation agreed on. Tumor now extended so high into groin as to leave barely room for tourniquet. When tumor was laid open, to the surgeon's surprise no fluid arterial blood was seen; the black, clotted blood was removed, but there was no hemorrhage. On careful examination it was found that the caliber of the artery had been obliterated above and below the tumor by a natural adhesive process. When the tumor was opened a singular substance appeared, about the size and shape of a man's open hand, placed longitudinally, one edge being towards the bed of the tumor, and the other towards its surface. This was in the midst of the grumous blood, and not in contact or connection with any part of the tumor wall. It was of a light florid color, with longitudinal fibres, of

the consistence of long boiled beef, and could be shredded in the same way. It is probable the gluten of the blood had been converted into this fleshy mass by having been forcibly driven through the aneurysm. Later there was a hemorrhage from the sloughing off of some mortified flesh, exposing another vessel. Six months after the operation the patient enjoyed better health than usual.

There are two singular points in this case: the fleshy mass in the coagulated blood and the obliteration of the caliber of the artery, whereby a spontaneous cure of the aneurysm had taken place. There was no doubt the caliber of the artery had been obliterated. The probe was repeatedly passed into it from the aneurysmal sac, and the cavity of the artery could be plainly deciphered above and below the tumor, terminating in a cone, beyond which the probe could not be passed. The circulation through the aneurysmal tumor was impeded probably by the growth of the fleshy mass and the blood was compelled to seek some other route. The collateral arteries were enlarged and anastomosed in direct proportion to the obstruction of the main artery, and the caliber of the artery gradually accommodated itself to the diminishing quantity of blood sent through it. The obstruction was increasing and the collateral branches enlarging and anastomosing while the circulation through the tumor was diminishing and the bore of the artery contracting. The process was gradually carried on till the obstruction was complete; the anastomosing branches were so enlarged as to convey all the blood sent to the limb and then the sides of the main artery adhered by a natural process, a new circulation having been established much in the same way as after an operation for aneurysm.

The exact time which the process commenced or ended is not known. An important change appears to have taken place the first of January when the bandage was applied the second time. The tumor then increased very rapidly in size, the pulsation became extinct and the coldness and numbness of the limb were much more severe than ever before. It is supposed that at this time there was a rupture of some of the coats of the artery, and that the circulation was formed, as the coldness and numbness after this began to abate and since the operation have practically ceased.

The Author's Case—That there should have been repeated traumata at the site of the aneurysm, with rupture of the arterial coat, obliteration of the cavity, absence of discernible pulsation beyond, and an evident satisfactory establishment of collateral circulation, with no other phenomena traceable to the tumor formation, justifies the presentation of the following case:

On March 21st, 1917, Turner Evans, colored, age 32, single, entered the Virginia Hospital, Richmond, Va., complaining of a tumor on the anterior aspect of the right thigh, just below Poupart's ligament; it was the size of a grape fruit and had been inconveniencing him so much on account of the size of the growth and pain that he was unable to carry on his work. For two years he had been at work at a band rip-saw as a planer. At the rip-saw he had

to reach over at arms length, catch the planks and throw them to one side, he had noticed that the level of the table struck him just where he now has the tumor (at the level of the saphenous opening). He had been working about eighteen months when the tumor appeared about the size of a walnut. He continued to work, however, until it got larger and began to throb. He then consulted a physician who gave him an application to put on the swelling and told him to rest a week before returning to work. But the growth continued to increase in size and at this time was probably as large as a pool ball. He did not return to work for about three weeks, the rest in bed having made the swelling decrease somewhat. He noticed in November a return of the pain and that it increased constantly in severity, and that there was now a coldness and numbness in the right leg, but that it was not swollen. On account of the pain in the tumor he was forced to give up his work in February, and entered the hospital March 17th. He had noticed that the tumor had never throbbed since it was the size of a walnut.

Examination. A well nourished man, weighs 145 pounds; heart, lungs and abdomen negative; there is no edema of the leg or thigh below the tumor; the measurements from below the level of the tumor are the same on the left leg as on the right. There is no edema and there is nothing noticed about the nails or trophic centers on either side; the sensation in the leg is good, and the reflexes the same on both sides. On the anterior aspect of the right thigh, about the saphenous opening, is seen a large symmetrical tumor about the size of a grape fruit. The skin over the mass is normal, there is no discoloration, nor are any varicose veins noticed. The tumor is well rounded, form, its limits are well defined, apparently it is fixed superiorly, and enjoys a greater excursion laterally and less supero-inferiorly; at its lower pole it is somewhat more superficial and is fixed by the fibers of (what is taken to be) the sartorius muscle, which may be felt crossing internally and anteriorly from above downward. The tumor is distinctly cystic in character, but varies in its consistency, it is not painful, no thrill is obtained and no bruit can be elicited, there is no pulsation.

Right Radial B. P. 118.

Left Posterior Tibial B. P. 130.

No pulsation could be elicited in the right leg below the level of the tumor.

3.21.17. Urinalysis-Turbid, reaction acid, Specific Gravity, 1023, no albumen, no sugar, no diacetic acid. Indican positive, pus, blood, mucous, crystals, casts, chlorides negative.

3.21.17. Blood examination, whites 9,400; polynuclear 60, large mononuclear 7, small mononuclear 37, eosinophiles 1.

3.28.17. Wassermann, 4 plus.

3.30.17. X-ray examination. Soft tissue tumor, not involving bone, probably aneurysm. Dr. A. L. Gray.

4.3.17. Pulse 96, temperature 99.4, respiration 22, *operation*

April 2nd. Under general ether narcosis a long incision (10 inches in length) is made from the sum-

mit of the tumor downward on the anterior aspect of the thigh, the skin and fascia are retracted, the fibres of the sartorius are thinned out in parallel bands coursing over from the upper to the lower pole. On retraction internally the covering of the mass is noted to be of a more gray-blue color, with apparent necrotic areas here and there on its surface, one of these spots breaks down and allows about an ounce or so of black clotted blood to evacuate itself. The line of cleavage is difficult, the tumor is freed laterally, it is now attached only by its two extremities, the femoral vein at this point is torn and requires ligation, as quite a little hemorrhage starts up; this is readily controlled. The tumor is reflected upward, stripped from the crural nerve, which lies behind the growth, the femoral artery is doubly ligated with heavy catgut about two centimeters below Poupart's ligament, the artery is similarly tied off just below the tumor, the fascia is brought together with continuous catgut, rubber drainage is inserted and brought out at the lower angle of the wound and the skin is sewn up with silkworm gut. The tumor is symmetrically round and measures 10 inches in circumference.

Report by Dr. S. B. Moon, Professor of Pathology, Medical College of Virginia.

ANEURYSM OF FEMORAL ARTERY.

"The specimen, after fixation for several days in 10% formaldehyde, is nearly spherical, but distinctly flattened on one side. It is a sac, apparently formed of the distended arterial coat, and coated over most of its surface with closely adherent fibrous or muscular tissue. In size it measures 10 inches in circumference. The wall is nearly as thick as that of the artery except on one side, where it is thin and translucent. The attached artery communicates with the sac obliquely, and then is lost in its wall, becoming apparently obliterated.

Within the sac are two large somewhat laminated clots, and several smaller ones, the rest being filled with coagula which shows a tendency towards lamination, concentric as to the sac."

The patient made an uneventful convalescence and left the hospital in two weeks having been warned to continue his "mixed treatment pills."

February 1, 1918, he reports he has been at daily work since June 1917, gained in weight. The sensation, appearance, circulation and reflexes of the leg are perfect, and no evidences of aneurysm formation can be noted elsewhere.

THE DIAGNOSIS OF GONORRHEAL VAGINITIS.

To establish the diagnosis of gonorrheal vaginitis in children and infants, it is necessary to have: 1. A purulent discharge from the vagina. 2. The intracellular Gram-negative diplococcus of Neisser must be discovered in the pus cells (smears and cultures are facilitated by the endoscope). 3. This organism must further be grown on suitable culture media and properly identified as the gonococcus. 4. In case of doubt, complement-fixation tests and agglutination tests should also be resorted to. In the absence of these tests we are not justified in considering any vaginal discharge in children as gonorrheal, nor are we justified in treating it as such. The smear examination, even by the Gram stain of secretion or discharge from the vagina, is unreliable and misleading, and hence valueless as a method of diagnosis.—I. C. RUBIN, M. D., in *The Boston Medical and Surgical Journal*.

SYSTEMIC MANIFESTATIONS OF DISEASE
IN THE THROAT.

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While in its broad sense the title assigned me would include systemic disturbances coincident with toxic absorption from acute infections of the throat, such as diphtheria, follicular tonsillitis, Vincent's angina, etc., I take as the intention of the committee that I shall discuss the causal relationship between chronic tonsillar infection and systemic diseases.

It has long been known that local infection in the mouth and throat may cause general infection, yet only in the last ten years has the medical profession developed an interest in focal infections and their etiological relationship to systemic disease. This has been made possible by our increasing knowledge of bacterial life and its effect upon the animal economy.

Billings, who has contributed largely to the literature on the clinical manifestations of focal infection, defines a focus of infection as a circumscribed area of tissue infected with pathogenic micro-organisms. The focus may be primary, as we find it communicating with the skin or mucous membrane, or it may be secondary, the lymph and blood streams or contiguous tissue acting as the means of extension.

While primary foci may occur in any part of the body, it is now generally believed that the mouth, throat and nose with its accessory cavities, furnish the most common sites for primary infection. The genito-urinary, alimentary and respiratory tracts and the skin are also not infrequently the sites of primary confined infection.

Since the advent of the microscope and the development of bacteriology, we have known that the mouth, nose and pharynx constantly harbor many varieties of pathogenic germs, among them being the various forms of streptococci and staphylococci, pneumococci diphtheria bacilli, tubercle bacilli, etc., besides a great variety of saprophytic organisms. In addition to bacterial life, certain fungi, unicellular animal life, and the protozoa, have been found in the mouth and throat where they are known to have caused infectious diseases. The presence of the entameba buccalis in pyorrhea alveolaris and its frequent presence in the tonsillar crypts, has in the last few years been recognized and its significance much discussed.

The knowledge that the tonsils harbor various

pathogenic micro-organisms and the observation that acute tonsillar inflammation frequently preceded attacks of arthritis, led to further investigation regarding the relationship between the two. For some time the causal relationship was based only upon this clinical observation, and upon the relief obtained from recurrent joint and muscle inflammation, as a result of the removal of the tonsils.

As late as three years ago Dr. Lewellys F. Barker, Professor of Medicine at the Johns Hopkins University, in his study of arthritis, spoke of the fact that a number of bacteria had been described as the cause of acute rheumatic fever; but that a large number of blood cultures to determine the presence of bacteria (in the blood) had been made by competent bacteriologists with uniformly negative results. His own studies of blood cultures and of the synovial fluid of arthritics were uniformly negative, yet he looked upon acute rheumatic fever as a definite infectious disease probably depending upon a primary infection in the throat, with secondary invasion of the blood by the virus and a final metastatic involvement of the joints and other parts of the body.

The belief has been growing that malignant endocarditis, myositis, myocarditis, and various other internal diseases formerly of obscure origin, are the result of a confined focus of infection. In 1914, Poynton and Payne in England and Rosenow in this country were able to isolate bacteria from the blood of individuals affected with acute polyarthritis. To Rosenow most of the credit is due for his careful and painstaking animal experiments in an endeavor to prove the theories as to the relationship of focal infection to constitutional diseases, and that arthritis, endocarditis, myositis, and the various lesions occurring secondarily to cutaneous and mucosal infections are due directly to bacterial migration.

Rosenow was able by special methods of culture to grow the streptococcus from the blood and synovial fluid of arthritics. All of you are no doubt familiar with his mutation experiments. He has been able to transform the pneumococcus isolated from the blood of a pneumonia patient into a hemolytic streptococcus by passage through several animals, and with these transmuted forms injected into the body of animals has produced arthritis, myositis, nephritis, gastric ulcers, etc. It has been shown that in acute rheumatism the primary focus frequently shows the pneumococcus on cultural examination, while from the blood are grown chains of streptococci. Rosenow further produced rheumatism by injecting the streptococcus

isolated from the blood of rheumatics. Following the postulates of Koch, the streptococcus taken from the tonsils, grown in pure culture and injected into animals, caused myositis, endocarditis, etc. At present a number of investigators have been able to substantiate Rosenow's results, though many, probably on account of faulty technic in method of isolation and inoculation, have failed to do so.

Barker, in his more recent publications on the subject (*Monographic Medicine*, 1916), accepts Rosenow's views after having sent one of his assistants to work with Rosenow and acquire his technic. He has since been able to isolate streptococci from the blood of arthritics similar to those described by Rosenow.

In a recent contribution on the bacteriology of focal infections W. R. C. Voigt (*J. of Oph. Otol. & Laryn.*, 1917) speaks especially of the gravity of the staphylococcus. He states that the majority of local infections in which this organism is present have to be considered dangerous because metastases often occur, and bacteremias and septicemias are not infrequent. Even where infection remains local, damage is always done by toxic absorption. He classifies the streptococci according to their potency and impotence to manufacture hemolysis. He found the hemolytic variety in 30 per cent of all cases of diseased tonsils, especially of the atrophic variety, and in about 80 per cent of all cultural examinations made from the depths of the crypts of enucleated tonsils.

While the exact nature of the systemic infection arising in the throat is yet uncertain, it is evident that practically any part of the body may be the site of the secondary infection,—foremost are acute and chronic polyarthritis, myositis, myocarditis, malignant endocarditis, pericarditis, acute nephritis, acute appendicitis, cholecystitis, pancreatitis, thyroiditis, chorea.

It does not follow that an individual with a focal infection in the throat or elsewhere will necessarily develop secondary systemic disease, for it is evident that only a small proportion of those having primary foci develop constitutional disease. The streptococcus, for instance, may be a constant inhabitant of the mouth (tonsil) throughout life without making its presence known, whereas in others it may cause lesions in distant portions of the body.

This relatively rare systemic invasion from focal infection is explained by the formation of a defending influence within the body, incident to bacterial activity. Locally this defensive process consists in the action of the leucocytes in forming walls

around the bacterial foci, which lessens the probability of systemic infection, and in the phagocytic action of the leucocytes and consequent bacterial destruction. Generally this defensive action consists in antibodies formed incident to bacterial growth and their dissemination through the blood and tissues, thereby lessening or arresting bacterial growth.

It is not uncommon for secondary foci of infection, such as infected lymphatic glands, to be the source of systemic infection either in the presence of the primary focus or after the distal focus has been removed. It is also possible for structures like the tonsils, which are usually the site of primary infection, to become infected secondarily to other structures and then to eventually cause systemic invasion.

From a practical standpoint it would interest us to know just how we can determine, in a given case of constitutional disease, whether the tonsils are the site of the primary focus. All of us have had patients referred to us to determine whether the tonsils were the cause of this or the other infection, and you will agree with me that our task has not always been easy; sometimes, in fact, an impossible one.

It is, of course, unwise to conclude that because an individual with polyarthritis, endocarditis, myositis or kindred affection has had an occasional attack of sore throat, that his tonsils are necessarily at fault in the etiology. Other avenues of infection, such as the nasal sinuses, the teeth, the alimentary and genito-urinary tracts, must be borne in mind, and, even though we find by bacteriological examination of the tonsillar crypts that they contain pyogenic bacteria, the remote infections are not necessarily due to the tonsils. On the other hand, too, the absence of infectious elements in the tonsillar crypts does not exclude the possibility of an etiologic relationship between the tonsils and the systemic disease. In such cases the infecting element may have disappeared in the tonsils and have invaded a proximal chain of lymphatic glands, through which the more remote infection has occurred.

In a general way I believe we are justified in saying that the appearance of the tonsils cannot be taken as a criterion whether or not they are a menace to the individual. It is reasonable to assume that the chronic hypertrophy which develops during childhood is due to recurrent attacks of inflammation of varying degree brought about by the presence of pyogenic micro-organisms, yet all hypertrophied tonsils are not infected, and outside

of the local disturbance resulting from their mechanical presence they are not a menace to the body.

We naturally determine as far as possible the condition of the tonsils in a case in which these organs are suspected of being foci of infection. The palpable cases of diseased tonsils with encased pus showing through the mucous membrane, or where the crypts are readily emptied of foul masses by the use of air pressure, are not the ones that leave doubt of their infectious nature, nor are the large spongy tonsils with more or less redness around the fauces; but it is in the cases where nothing abnormal can be detected with the naked eye, even when the patient retches and forces the tonsils forward and exposes many of the crypts, where the decision of cause and effect is difficult.

One of the most valuable signs indicative of tonsillar infection is glandular enlargement in the neck, more especially the gland lying in the angle between the facial and internal jugular veins below the angle of the lower jaw. As this gland forms the first relay of the lymphatic vessels emanating in the tonsil fossa, it readily becomes enlarged and oftentimes tender to the touch during tonsillar infection, and hence furnishes a valuable aid in identifying the tonsils as a source of systemic infection.

Whenever the tonsils can readily be recognized as the foci of infection, in cases of systemic disease, their removal is imperative and should be urged; but not before other structures in the body which are frequently the sites of focal infection are eliminated. In the absence of sinus disease, with no alveolar abscess, or pyorrhea alveolaris, and with reasonable assurance that the alimentary and genito-urinary tracts are not at fault, it would seem that tonsils and adenoids should be removed in cases of systemic involvement, even in the absence of any history of tonsillar disease, and in the absence of any apparent trouble in these structures.

As the association of the tonsils with arthritis, myositis, etc., is of recent origin, the literature contains but few case reports to furnish proof of the permanency of the results after tonsil operations. In the Bulletin of the Johns Hopkins Hospital for 1917, Crowe, Watkins, and Rothholz report ninety-one instances of infectious arthritis in which the tonsils were removed, of which thirty-one patients could be followed and the ultimate results noted. In twenty-four the joints were normal after one to two years. In some the patients were worse for a while and began to improve after two to three weeks; oftentimes it was six to eight months before all joint symptoms disappeared. In four

cases the joint lesions were improved but not cured. Two patients were not improved, and one has been worse since the operation.

In all cases of myositis after a year or two the trouble had entirely disappeared. In acute rheumatic fever (polyarthritis), often with heart lesions, the joint disease disappeared, but the heart complication was permanent in many cases.

In eighteen patients with nephritis, sixteen of whom had a history of tonsillitis and eight having either cardiac or joint lesions, twelve showed no albumin eight months to three and a half years after the operation.

CORD INJURIES IN SPINAL FRACTURES*

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Until the last few years surgeons generally were of one opinion as to the proper treatment of cord lesions following fracture. Briefly, this opinion was that in fracture with symptoms of partial injury to the cord, in the absence of bony deformity, or of determinable loose fragments of bone, it was wiser to defer operation until the cord had made what repair it could, or until improvement had come to a stand-still; and that fracture with complete abolition of function below the injury apparently proved a complete cord lesion and no operation was justifiable.

This stand was taken by surgeons for two reasons: (1) It was generally believed that all the injury to the cord was immediate, received at the time of the fracture. Therefore as lacerated cord fibres do not regenerate early operation was useless. (2) Laminectomy was a fairly dangerous operation.

Progress in any department of medicine is slow and gradual and in no branch of surgery has progress been hampered more by the beliefs and practices of the past than in spinal cord surgery. Examination of text books and recent articles show that very many surgeons still adhere to the opinion that in the great majority of cord injuries following fracture it is better to delay operation for periods of time varying from weeks to months. This stand is not justified in this day, I believe, and cannot be defended on theoretical, experimental, or clinical grounds.

Fractures of the spine without cord injury are rather numerous. According to Pierce Bailey, in almost one-third of the cases of fracture, the cord escapes injury. These cases are to be

*Read before the New York and New England Association of Railway Surgeons, November 8th, 1917.

treated as are skeletal breaks elsewhere, by immobilization, and are not of especial interest to the neurological surgeon unless signs of cord or nerve-root involvement arise later, due to new bone or scar formation. In the last two years I have seen five such cases, two in the cervical region and three in the dorso-lumbar region. In all five cases there was extensive destruction of bone; in three of them the vertebral body being almost completely crushed and yet there were no signs of cord injury. As we know that several laminae can be removed without appreciably weakening the spine, and as these cases show extensive destruction of the vertebral bodies without cord injury, it would appear that the main strength or support of the spine lay in the articulations of the transverse processes.

Fractures with cord injury may be easily divided into two classes: first, fractures with symptoms of partial abolition of function, and, second, fractures with symptoms of immediate complete abolition of function.

In fractures with signs of partial lesions of the cord, the opponents of early operation have maintained that the damage to the cord is immediate following the injury, that laceration of the cord cannot be remedied by laceration and that the nerve fibres, if severely injured, degenerate whether compression is immediately removed or not. That removal of pressure by early operation will not cause the already destroyed fibres to regenerate is true. But the opponents of early operative interference have overlooked several important facts; that is, in fracture with damage to the cord, there are other factors that will work harm to the nerve fibres in addition to the damage received at the moment of injury. The immediate damage is due to fragments of displaced bone causing contusion or laceration of the nerve fibres, or a narrowing of the canal by the fractured laminae or a projection backward of a vertebral body causing compression of the cord. In these cases the symptoms of cord injury arise immediately after the accident. The other factors I spoke of are:

1. Hemorrhage, either into the cord substance, causing laceration of the fibres or hemorrhage around the cord, either intra- or extra-dural, causing compression of the cord. In these cases the symptoms come in slowly, may be hours after the injury, and are usually progressive.

2. Edema both within and around the cord, causing compression of the fibres. In itself

edema gives rise to symptoms that appear, like those due to hemorrhage, some hours after the accident, and these symptoms are progressive. This edema, present after every injury to the cord, and by its compressive effects so destructive to the nerve fibres, forms one of the chief reasons for early operation. Its power to harm has been overlooked in the past and recent operations have shown that in many cases, signs indicating injury or compression of bone are really due to the compressive and destructive effects of the edema.

A factor later appearing is narrowing of the spinal canal at the site of injury by new bone growth or the formation of scar tissue; here the symptoms arise months after the injury.

These factors operate singly or in combination. It is only in rare cases and in the slighter injuries that these factors operate singly. In the majority of fractures of the spine, two or more, and at times, all of these factors are seen. That is, in fractures with laceration or compression of the cord by displaced bone, there is usually hemorrhage in or around the cord, it is always followed by edema, and often later by narrowing of the cord space by new bone growth or scar formation. However, in nearly every case one factor such as compression by bone, or hemorrhage in or about the cord so predominates as to render the other factors negligible for the time being, though later these other factors will add their quota to the sum-total of the symptoms, and have a strong effect on the outcome. In partial lesions of the cord there are found destroyed, damaged and sound fibres side by side. Of the destroyed fibres nothing is to be expected, aged and of many of the sound fibres depends on whether the factors producing the injury are temporary or permanent. These factors are they will not regenerate. The fate of the damaged by bone, blood and the certain edema which appears after every injury to the cord. If this compression is quickly removed not only will the sound fibres be preserved but functional and even anatomical repair will take place in many of the damaged but not destroyed fibres. But if compression due to any or all of the above mentioned three factors is at all severe and is allowed to continue for as short a period as four days, not only will secondary degeneration appear in the damaged fibres but many of the sound fibres will also be involved. If operation is not done early, compression by bone, hemorrhage or the quickly following edema may

work permanent harm. Interruption of conductivity of nerve fibers after fracture does not necessarily mean that those fibres are destroyed. In practically every case of partial injury to the cord many of the interrupted fibres will later functionate, and it is to preserve the integrity of the sound fibres and to give the best chance of recovery to the damaged but not destroyed fibres that early operation is urged. If these symptoms occurred in a structure of greater reparative power than the cord, a delay in operation would be justifiable in order to permit of recovery of the fibres from the initial injury but delay with tissue so feebly resistant as the cord in the presence of continued compression by bone, hemorrhage or edema, may cause permanent damage. In former years laminectomy was a formidable procedure, and operation was delayed on this account but with the present day improvement in technic and asepsis, the danger of laminectomy in skilled hands is but slight in comparison to the possible benefits.

The late John B. Murphy said: "In fractures without considerable displacement we are justified in assuming that the cord is not suffering continued compression regardless of the degree of paralysis; operation is not indicated. If this paralysis is due to laceration it will not be improved by operation. If it is due to the contusion it will recover without operation."

This advice might be good if displaced bone was the only factor in compression. But it overlooks the factors of hemorrhage and edema which, unless removed by operation, augment and continue the initial compression. It is true that lacerated fibres will not be improved by operation. It is not for their sake early operation is urged, but to give the best chance of recovery to the adjacent damaged compressed fibres and to preserve the sound fibres.

Allen has demonstrated the baneful effects of the edema by the improvement following experimental incisions into the cord after spinal fracture in animals.

This condition of cord edema is analogous to that seen in the cranial cavity after fractures of the skull. And just as the urgency of the symptoms in fracture of the skull call not so much for the location of the fracture and determination of hemorrhage, but for the relief of the general intracranial pressure, so in spinal fractures the demand is for relief of intraspinal pressure; and this is even more important than in head injuries, for the so-called silent areas of

the brain do not exist in the cord where serious damage to any part of the cord means permanent loss of function. The necessity of accurate diagnosis as to whether the damage is caused by contusion, laceration, or compression by bone, hemorrhage or edema does not exist. The urgent indications are for "spinal decompression" by laminectomy with free opening of the dura, giving the cord fibres the best possible opportunity for repair.

One stated objection to the early operation, or in fact to any operation in the absence of deformity, is that in many reported cases of early laminectomy little or no improvement followed, though no displaced bone was found; "and as the cord appeared normal, the dura was not opened." Such observations are similar to those regarding so-called cranial decompressions when the dura is not opened.

Compression of cord fibres by edema will not be relieved by the removal of the laminae alone. And just as in head injuries, removal of bone will not relieve the intracranial pressure unless the dura is also opened, so in spinal fractures a free opening for the dura is most important and should always be done.

It is said by many surgeons that early laminectomy adds insult to an already damaged cord, and yet these surgeons advise in midcervical fractures, with danger of involvement of the fourth cervical segment, immediate operation to prevent respiratory troubles.

E. W. Taylor, who holds that the damage to the cord is immediate following the injury, and that delay in operation is advisable, reports a case, and exhibits the cord of a large extradural hemorrhage, with organization of clot and resulting compression and paralysis of which he says that "operation would have been of benefit." Then why advise delay until the cord is irreparably damaged, as a wait of only four days may cause degeneration of the compressed fibres.

Bottomley also says that in partial lesions of the cord, if after waiting (weeks or months) no improvement occurs, or if improvement occurs and then ceases or retrogrades, operate. And yet what can be done by a late operation, in the face of continued compression of the cord by bone, hemorrhage, or edema, over a long period of time, that could not be better done and with more chances of benefit by an early operation.

Even if the symptoms of cord injury are but slight, if they are progressive, laminectomy should be done and the dura opened to allow of

drainage or whatever hemorrhage may be present and to ward off by this spinal "decompression" the effects of the edema which invariably follows injury to the cord, and which is so destructive to the delicate fibers.

Complete abolition of function. It is in this type of fracture that the opinion of surgeons is most sharply divided as to the advisability of operative interference. Many hold that immediate complete motor and sensory paralysis, with abolition of all reflexes below the lesion and loss of sphincter control, shows a total transverse lesion of the cord, and laminectomy is unjustifiable and can do no good. This would be true did the above symptoms positively indicate, as they do in many cases, complete destruction of the cord. But there have been many cases reported in which all the above symptoms were present and were considered complete lesions of the cord, in which later partial function returned even without operation, an many reported in which operation was followed by fair recovery.

Mixer and Chase report a case of fracture of the 4th, 5th, and 6th cervical vertebrae, with immediate symptoms of complete destruction of the cord. Operation was done twenty-four hours after the accident. Six days later sensation returned over the entire body. In two weeks there was some return of the reflexes and the patient finally recovered fair control over the bladder and fair use of the legs.

Guy Hinsdale reports a case of a woman with fracture of the 1st, 2nd and 3rd dorsal vertebrae, and complete and immediate paralysis of the body below the nipples. Laminectomy four days later showed the cord was edematous and pink, and much fluid escaped. Three years later the patient could walk with assistance, had control over the bladder, and touch sense was normal on one side.

The Bastian-Bruns, so-called, law, which is that there is a total loss of tendon reflexes in complete lesion, is, as an aid in diagnosis, only of value in a negative sense. That is, the presence of reflexes makes it certain that there is not a total lesion, while the absence of reflexes is not proof that the lesion is total unless such absence is persistent. In many cases of partial lesion there is a total loss of reflexes for more than eight days; so that there are no symptoms short of a deformity at the site of injury so great as to show complete obliteration of the spinal

canal, which prove a complete transverse lesion of the cord.

Other surgeons hold that in the absence of bony deformity as determined by the fingers and the roentgen-rays and with complete abolition of function, while it does not prove complete destruction it is better to delay operation until the cord has had an opportunity to recover what power it can; and when improvement ceases to operate.

Bastian, Kocher and others have outlined symptoms which indicate complete lesion of the cord, but the cases described above and many others show that these symptoms do not prove destruction of the cord, and we cannot rely upon them. Kocher believes that operation is unjustifiable in case symptoms of complete lesion are present, and favors operation in partial lesion when symptoms have come to a standstill. But, as we have seen, the symptoms of complete lesion are not absolutely trustworthy, and delay in partial lesion may irreparably damage the cord.

In my opinion, early laminectomy in skilled hands is the best treatment by far in fracture of the spine with cord lesions, and the only contraindication to operation is a bony deformity so great as to show beyond doubt that the spinal canal is obliterated and the cord hopelessly crushed.

The operation should be performed as soon as the patient has reacted from the shock and the site of the lesion localized. A free opening of the bony canal will relieve compression by bone, whether due to driven-in laminae or a backward projecting vertebral body causing angulation of the cord. If a projection presses against the cord in spite of the removal of the laminae, sufficient bone can be chiseled or rongueured to give the cord ample room. A free opening of the dura will permit of removal and drainage of blood, and will offset the compression of the following edema. The dura may be reclosed or not, as indicated by the condition of the cord. In many cases it is best left open. In cases with paralysis of the bladder, *catheterization should never be attempted. If it is done, the resulting cystitis will carry off 50 per cent. of the cases.* Massage of the neck of the bladder, or hot rectal injections will usually be found efficacious.

What shall be done in those cases in which at operation the cord is found completely divided? It is almost generally agreed at the present time that cord fibres once severed do not regenerate. Murphy said that if the cord is sev-

ered, approximation will avail nothing. However, of the five cases reported of severed cords sutured, four were living several years after operation, while without suture no patient has lived over one year. The great improvement following suture, in the sensory and trophic disturbances, thus averting the terrible bed sores warrant suture for this alone. The writer believes that suture of a severed cord should be attempted. If the ends cannot be approximated and the lesion is in the dorso-lumbar region—an attempt should be made to unite the roots above and below the lesion, as suggested by Kilvington. This cannot be done in the upper dorsal or servical regions, because of the short course of the roots in the canal.

In conclusion—We all know that there has been and still is a wide divergence of opinion among surgeons, as to the propriety, and as to the proper time of operating on these cases of cord injuries in spinal fractures. The divergence of opinion I feel is largely due to the fact that laminectomy has been regarded as a dangerous operation. But with our present day technic and asepsis, this is no longer true. In the absence of any deformity so great as determined by finger or x-ray, a deformity so great as to prove obliteration of the bony canal and destruction of the cord, in the absence of this, I say, there are no signs that reveal to us the extent or character of the injury. In a tissue so important and so fragile as the cord, delay may cause irreparable and permanent damage.

There are many cases seen of old fracture with cord lesion on whom, for various reasons, no operation was done or the operation was not completely successful. They present symptoms varying from simple foot-drop or spasticity of one extremity to paralysis with loss of bladder control. Many of these show increasing impairment of function due to late scar-tissue formation and collecting of fluid at the site of the lesion or to new bone growth. Many of these cases can be improved by operation even at a late date, and in some a brilliant result is secured. These patients should not be abandoned as hope less cripples merely because a period of several months or even years have elapsed since the injury was received. Although operation will completely relieve but few of them, yet definite improvement may follow laminectomy even at a late date.

However, the many cases reported of benefit resulting from late operation when symptoms of

progress cease or retrogression sets in, only indicates the good that could be done by early operation, for the factors of continued compression, bone, hemorrhage, or edema that brought improvement to a standstill had certainly worked harm that would have been prevented by early operation.

Therefore, I believe that in every case of fracture of a spine with damage to the cord, excepting only complete obliteration of the bony canal, an early laminectomy is urgently indicated to relieve the cord of the damaging effects of bone-pressure, hemorrhage, and edema, and to give the nerve tissue the best possible chance for repair.

CONCERNING BIRTH CONTROL—THE PHYSICIAN'S OBLIGATION.

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On one occasion a distinguished jurist, upon being interrupted in the midst of a brilliant argument before a jury by a question from opposing counsel, responded: "The friction of men's minds causes the sparks of truth to scintillate."

The problem to which I direct your attention is not a new one,—but the medical profession as a whole has rather avoided its just responsibility in this matter by leaving the propaganda of birth control in the hands of ultra-radicals,—and its discussion in many instances has been associated with more or less coarseness and obscenity.

Such moving pictures, as "Where Are My Children?" "The Unborn" and "Race Suicide," purporting to portray the purpose of the birth-control movement, are not only misleading, but are unjust and create a false impression.

As a practicing physician, therefore, and one deeply interested in social work, I desire to embrace this opportunity to invite upon this question the dignified and intelligent discussion which only physicians in good standing can bring.

In discussing this serious problem let us not confuse it with that other difficult and grave question of the induction of abortion, for, as says Yarrows of Chicago: "The birth-control movement deals only with the means of preventing conception, and the dissemination of knowledge concerning the intelligent use of such means as well as with the exercise of self-control."

To review briefly the history of this movement it is necessary to go back for over a hundred years,

—even to Malthus and his "Essay on the Principle of Population," first written in 1798. Malthus himself is pictured as a man of great magnetism, possessing a beautiful moral character,—the central principle of his essay was, as you know, that human beings are cursed with a power of reproduction quite out of proportion to their power to maintain all the individuals who may be born,—thus resulting in either misery or vice, unless a possible escape from this dilemma could be found through the exercise of "moral self restraint." Improvident marriages he sternly condemned,—refusing, however, to discuss or even to countenance the proposal that once persons were married, the size of their families should be made subject to deliberate control. He had demonstrated that over-population was the main source of suffering and vice, but had discountenanced the conclusion that such vast evil might justify resort to distasteful remedies, and in the opinion of many he had left the picture as black as he had originally painted it.

Jeremy Bentham, James Mill, John Stuart Mill, and Grote, the historian, were led by the teachings of Malthus to the conclusion that the ideal of the greatest good should be sought by the lesser evil, and Francis Place, a prosperous master-tailor, who sprang from the working class of London,—having learned by sad experience what over-population meant,—being the father of fourteen or fifteen children, gave his conclusions in 1822 in a book, "Illustrations and Proofs of the Principles of Population,"—that the only solution of the poor man's population problem was early marriage and limitation of family.

In the year following the publication of this book, leaflets were circulated throughout London designed to acquaint the working classes with means of preventing conception. These so-called "diabolical handbills," says Field of Chicago,—were first the cause of an outcry and then a more serious discussion,—and after attaining a considerable circulation were instrumental in bringing forth a more substantial pamphlet literature, of which Richard Carlile's "Every Woman's Book," and Robert Dale Owen's "Moral Physiology" may be mentioned as the most important items. The tracts attempted to deal with the physiological facts of reproduction as well as with the economics of over-population, and naturally prepared the way for the entrance of physicians into the Neo-Malthusian discussion.

In 1833, ten years later, Dr. Charles Knowlton of Massachusetts published his pamphlet "Fruits of Philosophy," in which he devoted a chapter to the prevention of conception. This gained a wide cir-

ulation in England,—and in 1876 furnished the ground for a prosecution which gave it great, though accidental, notoriety.

In 1854, just a few years prior to the Civil War, Dr. George Drysdale, in a remarkable publication, "The Elements of Social Science," taught that the physical and sexual functions of man were of equal importance and dignity to his mental functions, and that only by the prevention of conception could society escape the evils of poverty, prostitution, and celibacy.

This publication, together with a new edition of the Knowlton pamphlet published in 1877 by Charles Bradlaugh and Mrs. Annie Besant, precipitated their prosecution in the Court of Queen's Bench, before the Lord Chief Justice and a special jury, and both judge and prosecutor agreed that the able and dramatic defense had accomplished just what the prosecution had desired to prevent: the plea for Neo Malthusianism had been proclaimed to all England, and Mrs. Besant claimed that three months' sale of "Fruits of Philosophy" had disposed of as many copies as at the old rate would have lasted for eighty years.

This trial brought into prominence the Malthusian League, which became influential in organizing and diffusing Neo Malthusian opinions not only in England, but in Holland and New Zealand, and in many other countries the example has been followed, until the movement today organized or unorganized has practically become world-wide.

In New York City since last September Mrs. Margaret Sanger and various others have been disseminating birth-control principles, and have been prosecuted by the district attorney.

In the history of the movement the fact stands out prominently that the more the dissemination of birth-control principles have been opposed, the more it has flourished, attempts to suppress it have again and again given it fresh notoriety, and have aroused its partisans to new enthusiasm.

As intimated in the beginning, reputable physicians have been slow to accept their responsibilities in this matter, rather preferring to leave it in the hands of ultra radicals, who often have been in revolt against established religion, and the existing government, as well as traditional sex morality, hence discrediting the propaganda of birth-control by making it appear as the whim of immoderate and unbalanced minds. But, as says Field of Chicago: "Birth-control, no longer as a possibility only, but as an accomplished fact, demands our most discerning scientific attention. The practical question now is not whether the prevention of con-

ception shall be tolerated,—it is already tolerated and approved by great numbers of persons,—but under what circumstances is it to be tolerated, in what forms, for what purposes, to what extent, etc.?"

Our effort should be, not to keep it outside the moral pale, but to find a place for it among our civilizing discoveries.

As Yarrows of Chicago emphasizes, there are hundreds of children born into conditions physical and moral which mean neglect, high infant death rate, insufficient food, poor education with inevitable subsequent delinquency, vice, and crime. Other hundreds are born of syphilitics, epileptics, defectives, and degenerates,—these in addition to thousands who are conceived, but are never born, except through criminal abortion.

If I need then to make apology for directing your attention to this serious problem,—I would tell you that last June in my service at Grady Hospital out of one hundred and twelve patients, eighteen were admitted with incomplete abortions, and in July out of eighty-three patients admitted in one month alone, 20, or 25 per cent were for abortions complete or incomplete, and many of these gave a history of having had abortion done or begun with deliberation and; one of this number I distinctly recall, was admitted seven days following a criminal abortion, with septicemia and lived for only a few hours. The record at the hospital will show that these two months are not exceptions, but that the evil is continuous and increasing.

To continue to ignore this question is not therefore to save life, but to play into the hands of quacks and the abortionists. It is therefore in an effort to find alleviation for these ills, that we are forced to consider this question.

In Holland, New Zealand, and Great Britain a pamphlet may be secured for the asking in which in simple language directions for the prevention of conception are given. In these countries the number of abortions and unfit children has been greatly diminished, and the nations have become more vigorous and civilized. The fear of race-suicide has also been shown to be unfounded, for, while there has been a falling birth rate, there has been a corresponding falling death rate, showing that in the one case there were large families and many deaths, while in the other there were smaller families and few deaths. France, for example, in 1781 had no higher a rate of increase with a birth rate of 39 than in 1901 with only 21, for the fall of 17.8 in births was compensated for by the fall of 17.5 in deaths.

While we recognize the possibilities for evil in the unlimited freedom of birth-control, we are forced to admit that the prevention of conception is being practiced more and more by the intelligent, wealthy, and professional classes. The question for you and me to answer is: will we as physicians undertake our responsibility by furnishing scientific knowledge, or shall we leave it to the quack, and the ultra-radical?

Last September the medical society of Des Moines, Iowa, went on record as favoring birth-control. Professor Clarence Van Epps of the State University declared that the wealthy classes already have knowledge, and that the same knowledge should be given the poorer classes by the State.

Recently this question was favorably considered by a joint session of the Chicago Gynecological and the Chicago Medical Societies, and it is from the report of this meeting, published in the August issue of *Surgery, Gynecology, and Obstetrics*, that I have obtained many of the facts and ideas, and much of the verbiage here presented.

Like every physician, I suppose, I have directly or indirectly been requested at different times to induce abortion for various reasons, and my answer has always been a firm but unhesitating refusal. I should never entertain the suggestion of any such operation, unless the life of the mother is clearly in danger, and this fact has been positively substantiated by consultation with a colleague of unquestioned integrity.

But may I urge just here that when a toxemia of pregnancy seriously threatens a woman's life then there should be no delay in emptying her uterus. There is marked danger in waiting *too* long, even in a sincere effort to preserve for her her child, and both may be lost because of an over-conscientious but unwarranted delay.

To the question,—how may I prevent conception,—I have usually responded: If you don't want to get sea-sick, then don't go to sea.

In the future I am not so sure that I shall adhere so consistently to my policy relative to my answer to the latter question, for I am sure that there are many conditions wherein the physician's obligation to furnish scientific knowledge which may prevent misery, vice and crime.

But may I hasten to add, for fear that I may not be clearly understood, I believe that the greatest gift which God ever gave to woman is her power to become a mother, and I have no patience with, nor sympathy for, that woman who deliberately stultifies her womanhood. I agree with Dr. Anna E. Blount, who said that when the propaganda of

birth-control has become universal we will require another propaganda for voluntary motherhood. It needs to be the style and fashion for women to have fine children. This *also* should be a reform movement, and then we may have *fewer*, but a stronger and more enduring population.

In conclusion, if I may be permitted, recalling that famous expression of Cornelia, who when she called her sons to her side said, "These are my jewels," to employ a simile to that forceful aphorism of Thomas Carlyle: "This I call tragedy, that one woman should die childless, who possessed the LEGITIMATE ability, physical, mental and moral, to become a mother."

THE REPORT OF A CASE INVOLVING
THE SURGICAL CORRECTION OF A
DOUBLE HARE-LIP ALVEOLAR
CLEFT, AND CLEFT OF THE
HARD AND SOFT PALATE.

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Name: W. V. M. Sex: Male. Age: 4 years.
Nativity: American. Color: White. Weight:
34 pounds. Complaint: Hare-lip and cleft palate.



Fig. 1—Front view of the child before operation. The protruding mass obstructing its view. See Fig.

History: One of twins, youngest of family of five, three older children and twin brother normal. No history of hare-lip or cleft palate among relatives on father's side, mother, however, being left an orphan in early childhood, does not remember relatives.

Patient strong at birth, and suffered no chil-

dren's diseases excepting cholera-infantum, was bottle-fed, always healthy and playful, and is now a well developed child.

Examination: A double cleft of the upper lip extending into each nostril, Fig. I; a double alveolar cleft, Fig. II; a very marked protruding premaxillary bone holding two central incisors, Fig. III. The clefts of the alveolar process united with a medium sized cleft of the hard and soft palate.

The mouth was fair as to cleanliness, the mucous membrane normal, and no visible gingivitis or pericementitis. There were occlusal cavities in the lower second deciduous molars, the tonsils normal, and no enlarged adenoids.

Patient was referred to Marquette University Oral Surgery Clinic, Trinity Hospital, April 2nd, 1918, and prepared to be operated on April 4th, 1918.

Urinary analysis: Normal. Blood: Normal.

Patient was admitted to operating room at 7:45 A. M., and put under ether anesthesia.

Under the anesthetic further examination revealed that the protruding mass contained two centrals which were tipped lingually. In this case, the two lateral halves of the upper jaw were very well developed and held the following well-developed deciduous teeth, 5432 2345, the occlusion of these being in normal mesio-distal relation.



Fig. 2—Palatal view showing the complete cleft.

The shifting of the protruding mass distally would not permit the closing of the alveolar cleft, for the mass in itself was too narrow to complete the normal upper arch, and the anterior wall of the bone was found to be badly developed. The mass was ovoid in shape and stunted, evi-



Fig. 3. Side view showing prominence of the protruding osmaxium attached to the tip of the nose.



Fig. 5.



Fig. 6-(a) Front view showing result six days after operation with sutures still in place.



Fig. 6-(b) Side view under same conditions.



Fig. 7. Front view 8 days after operation. The nasal mucous flaps after sutures were removed.



Fig. 7-(b) Side view under same conditions.

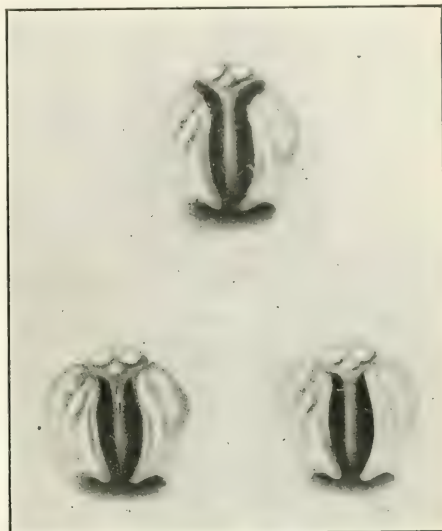


Fig. 4—(a) A drawing of the palatal view to show the double cleft and protruding premaxillary. (b) Showing the vomer cut so that the premaxillary bone could be forced into its normal position. (c) Showing the premaxillary bone wired in its new position.

dently due to the absence of lateral support and failure to functionate.

In many cases of double alveolar clefts we find that the osincisivism is usually larger than the mass herein described. It forms a projecting tubercle, covered by smooth mucous membrane on the inner side, with the central portion of the upper lip attached anteriorly. In an infant it should contain the tooth buds of the temporary and permanent central incisors, arranged in pairs, one above the other. This type of oral deformity is of the most pronounced kind, yet when operated upon at an early age (from one to three months) and the osincisivism well developed and large enough to close the alveolar cleft, I do a submucous resection and cut the vomer. This permits the forcing of the displaced osincisivism backward so as to form a satisfactory alveolar arch. The bone is then held in its new position by passing a silver wire through the vomer as illustrated in Fig. IV., a, b, c. In this way there is no injury done to the unerupted teeth. The borders of the alveolar cleft can then be cauterized several days later in order to get the tissues to unite in their new positions.

This, however, could not be done in this case since the osincisivism was undeveloped holding two centrals which were tipped lingually. Therefore, in view of the situation, Dr. A. Trigg, a prosthodontist, and I decided that it would be good surgery and far more practical to remove the protruding mass and prepare the vomer bone to act as a good stump for the artificial restoration of two central incisors. This was done under the following technic.

The muco-periosteal flap on the labial and lingual surfaces was dissected and the mass, containing the two deciduous centrals and the tooth buds of the permanent centrals, was removed, Fig. V. The flaps of the soft tissues were then brought in contact and stitched on to the lateral halves of the jaw bone so as to close the anterior portion of the floor of the nose. There remained only the cleft of the hard and soft palate. Following this operation, the double cleft of the lip was closed by bringing in contact the soft tissues which covered the protruding mass and the borders of the lip on each side. The vermilion surfaces were carefully joined and the alae of the nose were turned inward so as to give the boy the proper shaped nostrils. Paraffin silk was used to suture the soft tissues, Fig. VI, a, b.

The wound was kept clean by gently washing it with boracic acid solution.

On the eighth day the stitches were removed,

Fig. VII, a, b, and the lad was then able to function his lip normally.

In about six months or longer the cleft of the hard and soft palate will be closed. In order to keep the space open between the laterals, an orthodontic retaining wire will be fitted and adjusted so as to promote the space which, at a later date, can be restored with a well-fitted anchor denture holding two centrals.

PRACTICAL CONSIDERATION OF CEREBRAL DECOMPRESSION.*

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For practical purposes the cases requiring cerebral decompression fall into two major classes.

First class, including all conditions which slowly but progressively encroach upon the intracranial space, such as cerebral tumors alone, or cerebral tumors plus internal hydrocephalus through occlusion of the Sylvian aqueduct, or external hydrocephalus occasioned by diminished absorption through the subarachnoid space.

Second class, in which there is a rapid and progressive encroachment upon the intracranial space plus destructive lesions to some parts of the brain, the causative factor in this class being trauma.

In passing, we might mention a third class, namely, certain types of epileptics. By the epileptics we mean the idiopathic type, i. e., those in which there is an absence of a distinct lesion, such as cyst, adhesions, organized clot, depressed bone, or some other evidence responsible for the epilepsy.

It is a well-known clinical fact that certain idiopathic epileptics are benefited for a time at least by any operation whatever, be it a bunion operation, a circumcision, a herniotomy, or any other operation that by no logical reasoning can be associated with the improvement in the epileptic attacks.

There is a type of idiopathic epilepsy in which the seizures are preceded for from six to twelve hours by a gradually rising blood pressure and possibly an increasing cerebral turgescence, terminating in an epileptic seizure. These cases are benefited by the Kocher decompression operation, and are the only idiopathic cases entitled to surgical consideration.

The Kocher operation is more than a large trephine opening; its aim is to permanently supply a safety valve for the relief or modification of the cerebral turgescence, the climax of which is represented in the epileptic seizure.

*Read before the Louisville Medical Club, April 30th, 1918.

In the application of decompressive measures in cases of the first class, the aim should be to afford the greatest relief possible from the increasing intracranial tension with the least interference with the nerve tracts.

The indifferent observance of the foregoing is largely answerable for some of the failures, partial or complete, that attend decompressive efforts.

Since some cases demand a single decompression, with or without a tapping of the lateral ventricles, and others a double decompression with or without ventricular interference,—or where the growth is subtentorial, an occipital decompression instead of a subtemporal,—a certain knowledge of the location and nature of the tumor is necessary for the proper application of decompressive measures.

Nor should the decompression be deferred until the papilledema has reached an advanced stage. The eyes not only may require several examinations, but, according to de Schweinitz, should include a careful estimation of the visual field, the color perception, the light sense, and the size of the blind spot.

According to Elsberg, "except in cases of direct pressure upon the optic nerves or optic tracts without papilledema, I have never seen a patient blind for twenty-four hours recover sight, even with the rapid subsidence of the papilledema. The hope that some vision can be restored by a decompressive operation (or the actual removal of a tumor) is in my experience vain. In double choked disc the danger signals are fleeting attacks of blindness lasting perhaps only a few minutes at a time."

In the second class where the progression of symptoms is more rapid and the underlying trauma has frequently occasioned lesions in the brain, it requires a careful study of the case to correctly interpret the rapidly changing conditions.

Cushing's investigations have thrown light upon these changing conditions, namely, when the intracranial pressure is rapidly increased, there occurs a stasis followed by anemia that becomes general and effects the medullary centers. This anemia acts as a stimulus to the vagus center, and through this the pulse rate is lowered, and the vasomotor centers, through which the blood pressure is raised. Through this increase of the blood pressure the cerebral anemia is overcome,—if temporarily the intracranial tension again increases, which again produces the anemia, and which in turn again raises the blood pressure through the stimulation of the vagus and vasomotor centers. This process repeats itself until there results an exhaustion of the vagus

and vasomotor centers. Then we have the pulse changing from a slow and full pulse to a fast and soft pulse, and when this occurs it marks the beginning of the end. So long as the blood pressure remains in excess of the intracranial tension, the case is safe; but when the intracranial tension equalizes the blood pressure, the compensation will begin to break and then a fatal termination rapidly ensues.

Different explanations of the increasing intracranial tension have been offered, namely, localized stasis with transudation in surrounding areas; this process increases and spreads until the bulbar centers are involved (Hill and Bergman). According to Cannon, it is due to edema. Courtney attributes it to paralysis of the vasomotor centers from trauma, the paralysis resulting in a dilation of the vessels, stasis, thrombosis, and transudation.

It is generally agreed, however, that cranial injuries are commonly attended with increasing intracranial tension that may result in the compression of the blood vessels, terminating in anemia and death.

In recognition of these cases of head injury requiring decompressive measures involves frequent examinations directed especially toward the eye, the gradual rise in the blood pressure and the gradual and progressive decrease in the pulse rate.

A gradual and progressive rise in the blood pressure and a gradual and progressive decrease in the pulse in head injuries call for a subtemporal decompression, single or double, even though the eye does not offer evidences of a papilledema. Congestion of the retinal vessels and slight pinkish color of the discs are common attendants of head injuries and in themselves do not call for a decompression unless the changes are progressive.

Proper decompression in carefully selected cases not only affords the greatest measure of success, so far as recovery is concerned, but safeguards to a considerable extent the patient against subsequent neuroses common to head injuries.

SEPTIC WOUNDS.

If the conditions in a septic wound were the same as in a culture tube, surgeons would give up controversies and bury differences of opinions as to the claims for the highest efficiency of each of the many antiseptics and leave it to the laboratory worker to decide once for all which is the most efficient antiseptic; but the destruction of bacteria in a culture tube is a much easier and simpler matter than the destruction of bacteria when lodged in the living tissues or mixed in their debris. Almost all antiseptics have no selective, specific, or stronger action on the bacteria than on the living cells and tissues in which the bacteria are embedded. If they destroy the life of the bacteria, they destroy also the life of the cell. They are fixed by protein material, and apart from their action as a germicide we have also to consider their toxicity, solubility, absorption, and penetration when applied as a wash or dressing to wounds.—J. SALIBA, M. D., in *The New York Medical Journal*.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, JR., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

SUBSCRIPTION PRICE, ONE DOLLAR.

FOREIGN, SIX SHILLINGS.

Original, Abstract and Clinical Reports are solicited for publication with the understanding that they are contributed exclusively for this journal.

It is of advantage to submit typewritten manuscript; it avoids errors.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, AUGUST 1, 1918.

COMMON SENSE AND WAR SURGERY.

The following letter published in *The Military Surgeon* of May 1918 is such a splendid combination of wit and critique that we deem this publication a matter of unusual interest.

"In the first place I find that surgeons are somewhat in doubt and confusion regarding the whole question of the chlorine antiseptics. No one can believe in dichloramine who does not believe in the Carrel treatment, and no one can believe in any of the chlorine compounds who does not believe that Labarraque's solution was a good solution. Perhaps you will pardon me if I express my views on this subject and find it necessary to carry you back over what is undoubtedly to you a well-trodden pathway. Early in the war, the question of wound antiseptics arose and Lorraine Smith and Dakin, working independently of each other, came to the conclusion that chlorine was the most beneficial of the agents which they had tried. They then proceeded to study Labarraque's solution and found that this old, clinically proven antiseptic suffered from a chemical fault. It was alkaline, becoming increasingly alkaline as the chlorine was set free, and burned the normal skin. They each corrected this chemical fault by chemical means, namely, the addition of buffer salts; and these watery solutions, with chlorine as the active agent, achieved a great place for themselves and are probably in most general use today. Now, these aqueous solutions suffer

from another chemical fault which surgeons do not understand and will not learn. This fault is that the chlorine is given off explosively, so that within ten minutes after dressing the wound with Eusol or Dakin's hyper-chlorite solution, no more free chlorine can be detected.

It is manifest that this chemical fault can be corrected in either of two ways, mechanically, i. e., by adding the solution as often as necessary, or chemically, by putting it under such chemical conditions that the chlorine will be given off slowly as needed. Carrel undertook the mechanical correction and undoubtedly succeeded, but surgeons refuse to understand that in the Carrel method you must use either constant installation, or intermittent, at periods of not over two hours. Even today one will see surgeons putting on a wet Eusol dressing and sending patients on a 36-hour trip to England with no opportunity for a change of dressing. That these cases arrive violently septic should not surprise one, and they do it every day.

Dakin has been working to overcome this chemical fault by chemical means. His first effort was to find out the active antiseptic agent, and his work lead to the conclusion that it is not the free chlorine but the combination which is effected between the chlorine and the nitrogen of the tissues in other words, chloramine. So he endeavored to obtain a solution of chloramine, and the first result of this was "chloramine-T," an excellent antiseptic; but it suffers also from the fact that it is too explosive or, in other words, does not have the necessary depot action. The chemical fault of effervescence is not yet corrected. His further efforts gave us "dichloramine-T" which is only soluble to any amount in the essential oils (hence eucalyptol as a solvent), and then, to prevent the chlorine from being given off too rapidly, he added paraffin oil which acts chemically as a reservoir from which the chlorine is given off over a long period. This solution suffers from the fault of chemical instability, making it necessary to ship the remedy in three separate packages which, in these circumstances constitutes a difficult problem, because the base depots did not recognize the importance of keeping the three together. In consequence we hear of dichloramine having been tried and found wanting, because some tried it in water in which it did not dissolve very well, and some applied the dry crystals, they having received only one constituent of the triune group. So Dakin has been working to find a solvent and chemical protector in one, and this he calls chlorcosane. The surgical world seeing this strange word and jumping to the

conclusion that it must be something new, puts it into the category with acriflavine, brilliant green, mercurophen and other new things of which the surgeon says he has tried enough; he will stick to that which he knows. Yet dichloramine-T and chlorcosane, after all are nothing but Labarraque's solution refined, concentrated and purified and absolutely nothing new surgically.

The question of wound treatment is becoming more and more hopeless. The fundamental difficulty is that surgeons are not talking about the same thing. They fail to distinguish between wounds—between early infections, fully developed infections and late infections. Yet it is certain that the whole question of sepsis or antiseptics, and even perhaps the choice of the antiseptic, will depend upon the nature of the wound and especially upon the stage of the infection. We hear now constantly the statement that it makes no difference whether there are any bacteria in the wound or not, it can be closed just the same, meaning secondary suture. If they would only qualify this statement and say that an early wound, within 12 hours at the most, before there is any extensive growth of bacteria, can be closed without an antiseptic, if mechanically cleansed, even though there are undoubtedly some bacteria left, well and good; but when they apply this thought to wounds that develop sepsis and lymphangitis (and all infections are a lymphangitis, whether in the tissues or the joint cavities, the belly cavity or the chest, the organisms are always in the lymph spaces, unless it be that they have gotten into the blood stream, in which case the patient has passed from the hands of the surgeons into the hands of God) when they apply this thought to the kind of wounds we get here, 36 to 48 hours behind the lines, they are talking foolishness. Now they may say, these leaders, that they mean of course the first class of wounds only, but they are not saying so; and as leaders and teachers they should know by this time that their remarks will be taken literally. If it makes no difference whether there are bacteria in the wound or not, then we might just as well go back to the days when we stropped our scalpel on our bootleg. I presume we would get away with 80 per cent of the cases even then.

I hear constantly that the French are excising, sewing up immediately and curing 80 per cent of the cases; but I have not heard a single person yet who apparently has wondered what they are getting in the other 20 per cent. When you stop to think that from 40 to 60 per cent of our cases here, depending upon the nature of the convoys, are

returned to convalescent camp, that is, are healed in three weeks time at the most, then this French record does not look quite so wonderful, especially when you consider further that the French are more successful than any other of the belligerents in saving their men and are probably therefore, though I have no statistics, more successful in that they have a larger proportion of slightly wounded men. These slightly wounded men are of the greater military importance, since the saving of time lost in hospital is equivalent to an increase of man power; but they are not the cases which possess the greater surgical interest nor from which lessons concerning wound treatment must be drawn.

Again, one hears that all the antiseptics should be thrown into the sea. I cannot comprehend such a sweeping statement, for there will be a considerable number of cases in which free excision cannot be carried out because of anatomical considerations. A case in point is the following: A patient came to us with, among other wounds, a wound of the thigh. The C. C. S. had said a piece of shrapnel had lodged against the femoral vessels but had not injured them. The patient died and autopsy revealed a septic thrombus of the femoral vein at the site of the wound, with pyemia, etc. Complete primary excision was manifestly impossible except hip joint amputation. There was no antiseptic available, apparently (perhaps they had all been thrown into the sea). Yet to my tottering reason such a case would be better with an antiseptic than without.

Your specific questions are hard for me to answer because we are in a base hospital and do not see a great deal of work in question. My personal opinion is that there is no great demand for the highest type of brain surgeon. Like every other branch of surgery of war, one does his best with what has been left, and the man of good general surgical training will or should do as well as the highly trained specialist sometimes perhaps better. How many head cases are encountered I do not know. From what I know of general physiology, I suspect that the greater number of men hit in the brain excite only a certain theological interest. The question of transfusion is no nearer settled than it ever has been. As best I can learn, they do transfusion and some cases recover and some die, just as with salt solution.

The treatment of shock is just exactly where it always has been with the little ray of hope that some good men are at work upon it. It is certainly not true that shock is due to acidosis. A little thought ought to convince anyone of any experience that this cannot be so, because the most severe aci-

dosis he ever encountered clinically—namely, in diabetes—never produced symptoms of shock. That acidosis is present is almost to be expected because the failure of the circulation results in a failure on the part of the lung to properly oxygenate the blood. A necessary and natural increase of the CO content and therefore, again naturally and logically, a diminution of the alkali reserve; and also the sodium bicarbonate infusions do no more good in practice than anything else. I should say that, as always, common sense and trust in God still remain the best treatment of shock.

The more I see of this game the more it seems to me that what is needed is not the training of a specialist but the training of the good, old-fashioned, common-sense general surgeon. Just think for a moment that on several occasions here our old friend,——, the neurologist, has had to turn to and dress wounds. He and I have both been glad under the circumstances, that we had dichloramine. The only difficulty with the Carrel method here is that it simply cannot be done. Suppose your reservoir is frozen solid during the night, how can you keep up continuous irrigation."

THE BIPP TREATMENT.

The treatment of wounds presents a fascination at the present time because of the large variety of methods which have been suggested. Numerous adherents press the claims of their specific methods for general utilization. The problems of warfare multiplied difficulties which were rarely found in civil practice. The early experiences during the war represented the serious trials of the methods of civil hospitals under military conditions and in consequence the end results were not satisfactory. Rutherford Morrison in his recent book *Bipp Treatment of War Wounds*, while not claiming that his method represents the ideal, expresses the opinion that it is more nearly so than any other so far evolved.

He arrived at the following conclusion: "That if it is possible to get to the bottom of an infected wound so that it can be thoroughly cleansed mechanically, and suitable antiseptics be applied, the wound can be closed at once with interrupted sutures, always with impunity, and many times with the prospect of finding it healed when the dressing is removed for the first time at the end of three weeks." Acting upon this conclusion, he urges the Bipp method of treatment, though emphasizing the importance of the strictest surgical cleanliness in the operating the-

atres and surroundings, and the maintenance of an antiseptic and aseptic technic, insofar as may be possible. He cautions against dissecting out the wounds because of the dangers resulting if such a course be pursued by surgeons insufficiently trained as anatomists. While possibly an occasional death has been attributed to bismuth or iodoform poisoning, his experience would indicate that serious absorption is unlikely to occur if a satisfactory paste is employed and all excess is removed after thorough rubbing into the wound surfaces.

From the principles which he lays down it is patent that he believes the Bipp Treatment is particularly successful under war conditions of rescue, transportation, and hasty operation, as a means of securing primary union after the suture of infected and suppurating wounds. Its main value apparently lies in the fact that, to quote his words, "It is so simple that a *clever* surgeon is unnecessary for the achievement of the best results, though a *careful* one is essential."

In all probability, there is a distinct field in military surgery for the Bipp Treatment, when the Carrel-Dakin technic is entirely unavailable. It is difficult to estimate the value of special treatments or to estimate their ultimate field of usefulness. The popularity of a method, however, while it may attest considerable interest in it, does not suffice to demonstrate its worth. While no unreasonable claims are made, further tests and corroborative reports are necessary before passing judgment as to its advantages, disadvantages, benefits, dangers, indications, contrary indications, and permanent value in surgical methodology—I. S. W.

WHY SHOULD THE SURGEON GENERAL APPEAL FOR MEDICAL OFFICERS?

Of the 146,000 doctors in the United States, it is a safe calculation that at least 70,000 of this number are within the age limit, from 21 to 55 years, and are physically and morally qualified to serve as Medical Reserve Corps officers.

Why, in view of this fact, the Surgeon General's office should be hard put to secure a sufficient number of medical officers to supply immediate demands and to furnish a Reserve force of between forty and fifty thousand doctors is not quite comprehensible.

Every qualified physician, knowing how essential his services are to his country at this particular time, should consider it not only his duty, but a

privilege to take part in this glorious struggle for humanity and democracy.

This is the time when individual opinion must be sacrificed for the benefit of the whole and the time is near when every doctor must be in one or two classes; either a member of the Medical Reserve Corps, United States Army, or in the Volunteer Medical Service.

If you are between the age of 21 and 55 years, and there is a doubt in your own mind as to whether you are qualified or not, let the Surgeon General determine this matter by applying at once to your nearest Medical Examination Board for a commission in the Medical Reserve Corps.—MACD.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

CANCER AND ECONOMIC STATUS.

The problems of cancer continue to challenge the interests of those seeking to conquer disease. Biology, chemistry, immunology, bacteriology, are supplying hosts of careful, scientific investigators aiming to wrest the secrets of cancer from secretive Nature. Thus far, information is regrettably negative in character. The main factors in our information concerning cancer are in the elements that we believe we know cannot stand tests of rationality. In groping for clues as to its idiology, statistical methods have been employed in every possible direction. Knight and Dublin presented before the Association of Life Insurance Medical Directors of America a suggestive paper on, "The Relation of Cancer to Economic Condition." The basis of their study was the mortality records established in their various insurance departments.

Information derived from the investigation of insurance statistics properly prepared is of inestimable value. Regardless of the effects of medical selection, the data thus made available is more nearly accurate than that secured from other channels. The chances of death at various ages form the basis of insurance procedures. The authors point out that they have studied their records for three large insurance groups, namely, the Ordinary, the Intermediate, and the Industrial, representing three distinct economic strata of the population. The holders of Ordinary

insurance come from the most prosperous classes, while those possessing Industrial policies are representative of the great working population of America who pay for their insurance through weekly premiums of five cents or multiples thereof. The Intermediate group comprises a group of workers of wages above the average, thus enabling them to purchase their insurance in units of \$500.

To quote their judgment, "The highest cancer mortality rates are found among the Industrial population, the least are to be observed among the Ordinary and the Intermediate department shows a cancer rate which is between that of the Ordinary and the Industrial. In terms of economic status we may say that the incidence of cancer would seem on its face to be most highly represented in the poorest groups of the population, that the rate decreases as we approach the more prosperous people, and that this is generally true of both sexes and at most of the age periods." Their conclusion merits attention particularly because it is contrary to the opinion generally prevailing in the literature of cancer. They point out, however, that the reason for their results lies in the careful analysis of the mortality rates at each age group in each branch of their insurance. They point out quite properly that much of the statistical material relating to cancer and economic condition is inconclusive because it is limited to a comparison of the proportion of cancer deaths among all deaths in particular departments of insurance. It is obvious that cancer might show the highest proportion of all deaths among prosperous policy holders owing to a decreased mortality from such conditions as tuberculosis, alcoholism, accidents and similar pathological conditions more prone to occur among the industrial population with lower standards of income. Under such circumstances of comparison the proportion of cancer to all causes merely measures relative importance without indicating its absolute or relative incidence.

While the statement that cancer is more likely to occur among those with low incomes must be accepted with due caution, the point appears to be well taken that earlier figures utilizing the proportionate method are technically inaccurate as measures of the relative occurrence of cancer at various ages and in different economic groups. Knight and Dublin present a table showing the cancer claims and claim rates per 100,000 mean in force. For males ages 25 and over, the rate

in the Ordinary department (composite mortality figures 1914-1918 and 1919) while lives was 54.7; Intermediate, 54.9; Industrial, 140. Females, age 25 and over, 91.2, 87.0, 197.7 respectively. The differentiations are more marked when one considers a single age grouping during the main period of life when cancer is prone to attack. At the ages of 55 to 64, males, the rates were Ordinary, 275.2; Intermediate, 301.5; Industrial, 368.0. For females during the same age period, 318.5; 445.6. The authors point out that the smaller number of females exposed to risk in the Ordinary and Intermediate departments cause greater fluctuations in the figures of the various ages than are to be found among the males.

The effect of medical selection apparently is limited in their experience to the first two years, judging from a careful analysis of their figures in the Ordinary and Intermediate departments. Eliminating, therefore, for the sake of safety the first five years of issue in their Ordinary and Intermediate departments, and establishing comparisons with the cancer mortality in the Industrial department for all years of issue combined, because Industrial policy holders are merely inspected and do not undergo a complete examination, the figures are even more conclusive: Males 55 to 64 years old, Ordinary, 276.5; Intermediate, 295.1; Industrial, 368.0; Females, 353.6; 422.1; 429.6 respectively.

As a result of this interesting statistical investigation and analysis, there is reason to believe that the oft-quoted statement that a low cancer rate and poverty are correlated is probably without justification. If after further testing it is established as a fact that the incidence of cancer increases relatively and absolutely in the different age periods in inverse proportion to the degree of prosperity of a group, there will be another definite step in advance. Such a fact will direct the attention of investigators to specific causes more likely to be found among persons with lower vitality and diminished resistance as a result of their inability to achieve economic independence. While cancer probably never will be regarded as a disease of the poor, it is possible that its endemicity may be due to causes existent and kept alive by virtue of conditions, necessarily or unnecessarily, surrounding those living in a constant struggle with the elemental factors of existence in an unhygienic environment.

Book Reviews

The Spleen and Anemia. Experimental and Clinical Studies. RICHARD MOLES PEARCE, M. C., Sc. D. With the Assistance of EDWARD BILL KRUMBHAAR, M. D., Ph. D., Assistant Professor of Research Medicine and CHARLES HENNINGSON FRECHER, M. D., Sc. D., Professor of Clinical Surgery, University of Pennsylvania. 16 Illustrations, Color and Black and White. Philadelphia and London, J. B. LIPPINCOTT COMPANY. Price, \$5.00.

The authors have presented a compilation of work most of which had been previously presented through the medical literature or had served as the basis of public lectures.

The book is divided into three sections. The first by Pearce describes his experimental studies which served as the substance of the Cartwright lectures during 1916. The second part by Krumbhaar consists of clinical observations on the classification and analysis of types of splenomegaly accompanied by anemia, together with diagnostic methods and forms of treatment other than splenectomy. Part three, by Frazier, comprises a succinct and careful presentation of the surgical treatment, splenectomy.

The page distribution is possibly unfortunate in that the theoretical and experimental material receives more than one-half of the attention, while the definitely practical subject matter has the rest. Inasmuch as the experimental work has served in a large measure as the basis for the practical treatment of affections of the spleen, a legitimate excuse may be offered for this arrangement.

As stated in the preface, splenectomy is considered, "first, as a means of studying experimentally in animals the relation of the spleen to blood destruction and regeneration and, second, as a therapeutic procedure in the treatment of diseases of man accompanied by anemia." The volume is not to be regarded as one devoted to a discussion of the injuries, infections and tumors of the spleen. It is a highly particularized monograph, excellently written, logically arranged, and thoughtfully presented.

Radiography and Radio-Therapeutics. ROBERT KNOX, M. D. (Edin.), M. R. C. S. (Eng.), L. R. C. P. (Lond.) Consulting radiologist, Great Northern Central Hospital, London; Hon. Radiographer, King's College Hospital, London; Director, Electrical and Radio-therapeutic Department, Cancer Hospital, London; Captain, R. A. M. C. (T.) 4th London General Hospital (in charge of x-Ray Department), *Part I, Radiograph.* With seventy-eight plates (one in color) and three hundred and thirty-seven illustrations in the text. New York: THE MACMILLAN COMPANY, London: A. & C. Black, Ltd. 1917. Pp. 382. Price, cloth, \$9.00.

In Vol. I of the second edition of this book the author has considerably improved and amplified his already comprehensive work in the first edition. We believe this to be the best book on general roentgenology, written in the English language. In this new edition the author has added chapters on transportable field apparatus, localization of foreign bodies, and general roentgenology incident to war surgery; all of special interest just now, due to war conditions.

A beginner in the practise of roentgenology will find in this book instructive data as to installation and technic, and quite a sufficient number of reproductions, with text, to help him in his diagnostic work. The advanced student will be more interested in the newer features mentioned above, about which very little has been published recently. We feel now, as we did before, that the chapter on diseases of the bone, could be made much more illuminating and instructive. Aside from this we consider this work an excellent one from the viewpoint of book making, typography and printing.

A Text-Book of Obstetrics. BARTON COOKE HIRST, M.D., Professor of Obstetrics in the University of Pennsylvania. Eighth Edition. Revised and reset. Octavo of 863 pages, with 715 illustrations, 38 of them in colors. Philadelphia and London, W. B. SAUNDERS, 1918. Cloth, \$5.00 net.

Progress in obstetrics during the past five years has consisted particularly in the testing of various procedures aimed to increase the safety of women during pregnancy, labor and the puerperium. In the revision of his text-book, Hirst has included all the essential material for the guidance of medical students and general practitioners. The revision is commendable particularly in the intelligent reduction in the number of pages whereby condensation has been effected without the sacrifice of vital facts.

Illustrations are reduced in number without losing any of the explanatory values that arise from illustration. The publisher's work is as usual, well done so that the book as a whole maintains the high standard of previous editions and continues its place among the foremost text-books on obstetrics written by American authors.

Plaies du Pied et du Cou-de-pied Par projectiles de Guerre. (War wounds of the foot and arch of the foot.) Par E. QUENT, membre de l'Académie des Sciences et de l'Académie de Médecine; professeur de clinique chirurgicale à la Faculté de Médecine de Paris; rédacteur en chef de la Revue de Chirurgie. One large octavo volume of 464 pages with 477 figures and illustrations in the text. Paris: LIBRAIRE FELIX ALCAN, 1918.

This is a very splendid monograph embracing in its discussions all of the war injuries of the foot and its arch which have been seen in the war, and is based on a very large experience. The text is profusely illustrated with diagrams, photographs and figures and many points are continuously illustrated with case reports. Much attention is given to the pathological anatomy. The late results, which with these lesions are very important, are gone into thoroughly.

The subject matter is discussed under the following heads: nomenclature and classification of injuries; pathological anatomy; evolution of the injuries and the clinical course; late results; late results after resection or partial amputation of the foot; general conclusions.

This volume should find its place on the shelf of every military surgeon and orthopedist.

Thyroid and Thymus. ANDRE CROTTI, M.D., F.A.C.S., LL.D., formerly Professor of Clinical Surgery and Associate Professor of Anatomy at Ohio State University College of Medicine; Member of the American Medical Association, Ohio State Medical Association, Columbus Academy of Medicine, American Association of Obstetricians and Gynecologists, Society for the Study of Internal Secretions, Honorary Member of the West Virginia State Medical Society, Surgeon to Grant and Children's Hospitals, Columbus, Ohio. With 96 illustrations and 33 plates in colors. LEE & FEBIGER, Philadelphia and New York, 1918. Price \$10.

The artistic production of medical books is still sufficiently rare that commendation is due to the author and publisher of this work for its unusual beauty which appeals to the eye, as the subject matter attracts and holds the interest of the reader. No single volume contains a more valuable discussion of the thyroid and thymus glands and their diseases considered from the standpoint of anatomy, physiology, biology, pathology, operative technic, and constitutional effects.

Considering the general high standard of excellence in the discussion it is all the more remarkable that the psychic elements entering into thyroid disease are given such trifling and unsatisfactory consideration. The author apparently glosses over the facts of emotional disturbances as though they were subordinate to merit careful analysis, or else are too subtle to be interpreted in terms of physiological or anatomical relations. Possibly the fact that the

surgical idea appears to be of paramount importance accounts for the failure to discuss fully this phase of Grave's Disease, except in general terms of nervousness. This criticism, however, does not militate against the general value and usefulness of this monograph, which because of its otherwise thorough presentation of the subject merits careful study by those appreciative of the importance of diseases of the thyroid and thymus glands. The intrinsic beauty of the volume will appeal to the bibliophile, but the merit of the volume lies in the wealth of material with well illustrated context. It is bound to enrich the mental acumen of the reader. The book deserves a place in the library of every thoughtful medical man.

Modern Operative Bone Surgery. With special reference to the treatment of fractures. By CHARLES GEORGE GEIGER, M.D. Octavo; 286 pages with 120 illustrations. Philadelphia: F. A. DAVIS COMPANY, 1918. Price \$3.00 net.

This volume is "a comprehensive, yet abridged, book on plastic bone surgery." The opening chapters take up some general considerations, such as the histology of cartilage and bone and the functions of the periosteum, especially in a transplant, is emphasized. The evolution of the treatment of fractures is made clear and how it has led to the use of the open operation and the employment of foreign and animal-tissue means of fixation. The instrumentarium needed and the steps of the operative technic are described and profusely illustrated. A portion of the book is devoted to the treatment of special fractures. The book is completed by considerations of the use of bone grafts and of plastic surgery in various deformities and diseased conditions of the bones.

Burns and Their Treatment. Including Dermatitis from High Explosives. J. M. H. MACLEOD, M. A., M. D., F. R. C. P., Physician for Children of the Skin, Charing Cross Hospital, Royal Flying Corps Hospitals, etc. London, HENRY FROWDE, HODDER & STOUGHTON. OXFORD UNIVERSITY PRESS, 20, Warwick Square, E. C. 4. 1918. Price, \$2.00.

War has been responsible for an increase in surgical conditions due to burns, wherefore it is fitting to have a single little volume devoted to a discussion of burns and their treatment. The author has supplied a concisely written little volume discussing burns from heat, electricity, lightning, X-Rays, radium, corrosives, and high explosives. The author particularly favors the open method of healing, under a natural scab and regards methods of moist treatment inferior, while the paraffine method is held to be somewhat undesirable because of the offensive odors which may arise under the dressings utilized in this method. The illustrations and bibliographies under each subject add greatly to the value of this up-to-date, practical, pocket edition, war primer on burns.

The Treatment of Syphilis. A critical review by T. W. HARRISON, M.D., Ch.B., R.A.M.C., Lecturer in Venereal Diseases and Officer-in-Charge Military Hospital, Rochester. Reprinted from the Quarterly Journal of Medicine. Octavo, 74 pages. Oxford University Press, Humphrey Milford, 1917. \$1.00.

This monograph represents an excellent combination of a vast personal experience and a wide acquaintance with the best literature. The author concerns himself only with the general treatment of syphilis, and discusses the rationale, effects, complications and methods in the use of the various compounds of arsenic, mercury and iodides. Of special interest are his remarks on the complications of Salvarsan injections. He is a profound believer in the employment of hygienic injections of adrenalin both as an alleviant and prophylactic against such complications. Harrison's method of employment of Salvarsan and mercury does not differ radically from the conventional methods; he believes in the combined use of both drugs and in the necessity of courses of injections of Salvarsan, which are repeated according to the state of the Wasserman reaction. It is interesting to note, in connection with a recent controversy, that Harrison is sceptical in regard to the value of intraspinal treatment.

Progress in Surgery

A Resume of Recent Literature.

Gastric Hemorrhage. FRANK SMITHIES, *Medicine and Surgery, March, 1918.*

Gastric hemorrhage is associated with the following conditions: in all primary gastric diseases; in conjunction with chronic disease of the heart, or blood-vessels; with complicating chronic disease of the liver or gall-bladder or ducts; with splenic disease associated with enlargement; with acute and chronic pancreatitis; with toxemias associated with ailments of the kidneys, central nervous system, thyroid, adrenal or hemolymph nodes; with bacteremias; with chemical poisons; after local injury; disordered blood states (hemophilia); associated with the physiological cycles of females; following intraperitoneal operations.

Inflammatory Tumors of the Abdomen. PATRICK I. NIXON, *Annals of Surgery, March, 1918.*

Inflammatory tumors in the abdomen may gather around some lesion, such as a gastric ulcer, or around some foreign body. They need not be due to some specific agent as tuberculosis or syphilis. When in the abdominal wall they resemble desmoid tumors. The diagnosis is frequently not made. Surgery is contraindicated.

Splenectomy in Splenomegalies. AUGUST J. P. PACINI, *Annals of Surgery, March, 1918.*

Splenectomy is indicated in Banti's disease, especially in its early stages, in Griesinger's disease, in Minkowski-Chauffard and Hayem-Widal jaundice, in primary splenic tuberculosis, in hereditary splenic syphilis (after medication fails), and in malaria with splenomegaly.

Splenectomy is of questionable value in splenic infantile anemia, in pernicious splenomegalic anemias, in Gaucher's disease.

Splenectomy is contraindicated in leukemia or pseudo-leukemia and for the splenomegaly of kala-azar.

Obstructive (Malignant) Jaundice. JOHN F. ERDMANN, *Annals of Surgery, March, 1918.*

Operation is done because (1) one may be mistaken in the diagnosis, and (2) for palliative purposes. The latter include (1) relief of pain due to back pressure; (2) the relief of an intractable form of pruritus; (3) social or business reasons; (4) surgical euthanasia. For palliative purposes the best operation is cholecysto-gastrostomy.

Bile Peritonitis Without Evident Perforation of the Biliary Tract. J. J. BUCHANAN, *Surgery, Gynecology and Obstetrics, March, 1918.*

There is no typical disease picture to account for a bile peritonitis of the biliary tract without perforation. There is a group of recorded cases with abundant effusion in which no perforation could be demonstrated at operation or autopsy. These cases may be accounted for in a variety of ways, some fitting one hypothesis and some another, no one theory suiting all cases.

The bilious nature of the effusion still lacks the proof of a chemical examination. It is to be hoped that subsequent cases may be subjected to the test for bile acids and bile salts.

Up to the present the diagnosis has never been made. The treatment should be dry mopping of the peritoneal cavity with drainage to the common duct.

Tuberculosis of the Cecum. JOHN W. SLUSS, *Journal of the Indiana State Medical Association, March, 1918.*

Tuberculosis of the cecum is practically a primary affection and may be diagnosed in its early stages. In its later stages it may be mistaken for a suppurative appendicitis or for a carcinoma. The pathology includes ulceration of the mucosa; hyperplasia of all the coats and especially of the peritoneum; and a terminal cicatrization with stenosis. Excision offers an excellent prognosis in the early stages.

The Cholesterol Content of the Blood in Gall-Stone Disease. STANLEY F. KEMMANN and J. A. H. MACCOUN, *Surgery, Gynecology and Obstetrics, March, 1918.*

Cholesterol determinations in the blood of 60 patients with histories relating to upper abdominal lesions were made and their subsequent operative findings correlated. Certain correlated and parallel conditions were also considered. A hypercholesterinemia is not constantly present in cholelithiasis. Many conditions may affect the quantity of cholesterol in the blood. Therefore a hypercholesterinemia has no significance in the differential diagnosis of cholelithiasis.

Pneumococcus Peritonitis. PARKER SYMS, *Annals of Surgery, March, 1918.*

Pneumococcus peritonitis occurs as (1) an idiopathic disease, as (2) as a sequel to some previous site of infection, or as (3) part of a general septicemia in which other organs are simultaneously involved. The varieties found are (1) a diffuse general peritonitis, and (2) an encysted or localized process. The disease in three times as common up to the fifteenth year and is more frequent in girls than in boys. The generalized form is characterized by an initial toxemia which is usually marked, a second stage of abdominal symptoms, and a third stage of continuing and advancing peritonitis. When loculation takes place the abdomen is irregularly enlarged, and if perforation occur (frequently through the umbilicus) there is a discharge of characteristic pus. Serum therapy is advised.

Some Conditions of Artificial Stumps. E. MUIRHEAD LITTLE, *American Journal of Orthopedic Surgery, April, 1918.*

A good stump is characterized by a sufficient covering for the bone, sound healing, consolidation, painlessness, and freedom of movement. The fitting of an artificial limb is delayed by sinuses, painful nerves or tenderness due to inflammation of the bone, unsound scars, and contracture in the neighborhood of the joint immediately above the amputation.

The stump should be as long as circumstances permit. Exarticulations are bad because the articular end is too bulky and the flaps necessary to cover it must be large and are often difficult to get. A section through cancellous bone gives the best result.

The greatest difficulty occurs with the lower limb. A suitable appliance has been invented which gives to hip exarticulations a better functional result than to amputations through the upper third of the femur. The ideal location is between the middle and lower third of the femur or just above the condyles. Amputations through the knee joint are seldom satisfactory. Four inches below the knee is the point of election for amputations of the leg. Syme's amputation between the middle and lower third of the leg gives the best result. Chopart's amputation is apt to be followed by an equinus deformity. Pirogoff's amputation yielded bad results.

Regeneration of Bone. ALBERT A. BERG and WILLIAM THALHIMER, *Annals of Surgery, March, 1918.*

Periosteum devoid of adherent cells, when transplanted into foreign tissues, produces bone. Endosteum and osteoblasts lining the Haversian canals in bone transplants produce bone very actively. The cambium layer when adherent to transplanted cortex produces bone. Some bone cells in the transplants are able to persist for almost a year but most of the bone is absorbed. Fully developed adult bone cells, although they remain alive for a considerable time, do not reproduce themselves and form bone. Very young lacunar cells (frequently erroneously called bone cells) can reproduce themselves and form bone. Transplanted bone is absorbed not only by osteoclasts but also by a direct action (biochemical?) of growing bone and the transplanted bone is replaced either by a creeping forward of the new bone or a gradual extension of the new bone into the transplant. Marrow spaces and hematopoietic marrow are formed in the bone which develops from transplanted periosteum. Bone, when growing into cartilage, reproduces the normal enchondral development of bone.

Is Early Operation Indicated in Fractures of the Spine With Cord Symptoms? A. S. TAYLOR, New York, *New York Medical Journal*, March 30, 1918.

Taylor's experiences have led him to believe that it is unwise to operate such cases early, that is, within the first week. His reasons are the following: 1. The high mortality attending such early operations. 2. The dangerous handling necessary incident to the operation. 3. Because of the increase of false motion likely to follow removal of the arches and ligaments. 4. Because of the impracticability of fixation of the spine by external apparatus. Operation should be deferred until the vertebral bodies are solid enough to stand handling, and only then when improvement is slow or should cease too soon.

A New Procedure for Compensatory Shortening of the Unaffected Femur in Cases of Considerable Asymmetry of the Lower Limbs. JACQUES CALVE and MARCEL GALLAND, *American Journal of Orthopedic Surgery*, April, 1918.

The principle indications are shortening of the femur by more than 5 cm. after fracture or old congenital luxations and for coxalgia with shortening. The authors have three operative procedures for the correction of the deformity and they especially recommend the first: (1) "auto-pegging" in which, after division of the bone, a peg is fashioned from the cortex and inserted into the medullary canal of the other fragment; (2) the procedure of setting by tenon and mortise; (3) the procedure of direct dovetailing. This latter is the most difficult of the three. The results have been satisfactory although the authors believe that the time is still a little short for mature judgment.

Non-Union of War Fractures of the Mandible. P. C. COLE, *Lancet*, March 30, 1918.

Of 270 cases of fracture of the mandib, in 30 there was non-union. Of the 30, 12 were hopeless therapeutically. The fundamental principles underlying the treatment of these cases are two: 1. Restoration of the arch. 2. Maintenance of accurate occlusion. Perfect results were obtained by the author in 70% of his operated cases. The methods employed are the following: 1. Plating alone. 2. Plating with interposition of fragmented bone. 3. Wiring. This method is only applicable when there is little or no loss of substance. 3. Bone grafts. 4. Free autogenous graft. Ten cases were operated by this method. 5. Pedicled grafts. As far as we can understand Cole's description, a small portion of the anterior fragment containing periosteum fascia and muscle is departed so that it hangs by a pedicle; this is interposed between the fragments of the mandible and sewn in place. This method is highly regarded by Cole and afforded rapid and certain results.

Osseous Cysts and Giant Cell Sarcoma. EIVIND PLATOU, *Annals of Surgery*, March, 1918.

Ostitis fibrosa occurs most often in young individuals but may also be found in persons of fifty to sixty years. Trauma as an etiological factor appears in many cases. The course of the disease is chronic with comparatively slight symptoms, rheumatic pains and a slow bone swelling. The x-ray picture is often typical. The treatment is surgical, all diseased tissue must be carefully scraped out, and inside of the bone the cavity is found full of a brownish-red crumbling tumor mass. The disease is benign even when perforation of the cortex and periosteum has occurred.

Suturless Skin Sliding Method for the Radical Treatment of Lung Abscess and Chronic Osteomyelitis. EMIL G. BECK, *Surgery, Gynecology and Obstetrics*, March, 1918.

The methods of primary sterilization by means of aqueous flushings should be thoroughly tested to determine their effectiveness and applicability.

The excision of tissues, as now practised in the war hospitals, should be adhered to in order to prevent chronic suppurations.

When early sterilization is not obtainable and suppuration continues, bismuth injection treatment should be employed.

In the residue in which the bismuth is not effective, the cavities be obliterated by skin flaps after the method described by the author which, in his experience, has resulted in clearing up nearly all of the cases.

Urinary Extravasation. JOHN A. WOLFER, *Surgery, Gynecology and Obstetrics*, March, 1918.

Extravasation of clean urine may present few signs early and may not produce marked reaction for a period of time, up to two to four weeks, and then gradually destroy life by sepsis.

Urine in the presence of a stenosis of the urinary outlet is usually septic.

Many cases of urinary extravasation are caused by a rupture of the urethra due to an inflammatory process, which can be detected before perforation.

Urinary extravasation must be treated according to the condition of the urine. In clean urine cases, closure of the perforation with drainage in case of necrosis is the method of treatment. In septic urine cases suprapubic drainage with wide incisions in all infiltrated and oedematous areas, rest to the urethra, and subsequent careful dilatation of the strictures is the only safe method of treatment.

A Warning Against Operations for Varicocele on Applicants for Enlistment, Registrars for the Selective Draft, and Soldiers. JOSEPH COLT BLOODGOOD, *The Journal of the Tennessee State Medical Ass'n.*, April, 1918.

Bloodgood warns against performing this operation except in those in whom the vein is very large and incapacitating because the condition, as a rule, spontaneously disappears; because the patients are usually neurasthenics and the symptoms do not disappear after operation; because atrophy of the testicle may follow; and because hydrocele may follow and be more annoying than the original varicocele.

Infections of the Urinary Tract in Infants and Younger Children Due to the Bacillus Coli Communis. CHARLES A. SELLERS, *Journal of the Indiana State Medical Society*, March, 1918.

Acute pyelocystitis in children is frequently overlooked because of the neglect of the routine examination of the urine. It is more frequent in female children. The more probable route of infection is the blood stream; and it is probably aided by some factor which lowers the kidney resistance or which enhances the virulence of the bacteria. Acute pyelitis is probably never primary. The disease responds to alkaline treatment; urotropin and vaccines are most disappointing.

The Treatment of Chronic Cervical Catarrh. A HEINEBERG, Philadelphia, *Therapeutic Gazette*, April 15, 1918.

Heineberg believes that one of the most important reasons why the treatment of cervical catarrh is unsatisfactory is the failure to fully reorganize the etiological and complicating factors. To help the practitioner, Heineberg makes a systematic classification of the various etiologies and outlines the treatment for each. The most resistant form is the uncomplicated cervical catarrh. Here topical applications are the best form of treatment, but Heineberg emphasizes the necessity of thoroughly cleansing the cervical canal of the tenacious mucus before the affixation is made. To accomplish this, the author washes out the canal with the following mucus-dissolving solution: Sod. Bicarbonate, Sod. Borate, Sod. Chloride, a gr. dissolved in 4 oz. water. Of this solution, 1 drachm is dissolved in a pint of water. If the internal is as patulous, the solution is applied with a cotton application. When the canal is clean, silver nitrate is employed, beginning with a 50% solution and gradually decreasing. If the cervix is large and baggy, boroglyceride tampons are also employed.

Gunshot Injuries of the Peripheral Nerves. LEO MAYER.

International Journal of Surgery, March, 1918.

Injuries of the peripheral nerves complicate a large percentage of war wounds and frequently the immediate care should include proper splinting. Treatment should begin immediately because, if the paralyzed muscles are kept on the stretch, atrophy with muscle degeneration ensues. The splinting should bring the divided ends of the nerve close together. The paralyzed muscles should be kept in condition by massage, electricity, etc.

Primary nerve suture is seldom possible. Secondary suture is to be done as soon as possible when the symptoms are progressive. If the symptoms are regressive no operation is indicated. When the symptoms remain in statu quo it is better to wait until the wound heals.

The nerve may be partly or wholly divided, or bruised, or may contain a small hematoma or scar, or "concussion" is present without any nerve injury.

There are a number of methods of suturing a divided nerve. The author prefers a perineural stitch. When the gap is too large to be bridged by stretching, a transplant of some convenient sensory nerve may be interposed to make good the gap.

Depending on the character of the injury the number of successful results varies from 40 to 100 percent.

Harelip and Cleft Palate. G. B. NEW (Mayo Clinic).

Minnesota Medicine, January, 1918.

New describes the procedure employed for this condition for many years at the Mayo Clinic.

The child is preferably operated at the age of three or four months. Several days before operation the child is fed with a spoon or dropper in order to accustom it to this manner of feeding. No attempt is made to close a cleft of the alveolar process, the lip is brought together over it; this holds also in the treatment of the premaxilla. To obtain a satisfactory cosmetic result, the nostril must be shaped to correspond with the normal side.

The best time for closing the palate is when the child is a year or a year and a half old, before it begins to talk; closure at a much later date may, however, give quite good results, especially if the lip has been approximated at the proper age, so that the alveolar process will have become approximated. The edge-to-edge approximation or the Langenbeck operation is the operation of choice. It is most important to preserve the main branches of the great palatine artery.

The Effect of Trauma Upon the Laryngeal Nerves.

E. S. JUDG, G. B. NEW, and F. C. MANN, *Annals of Surgery, March, 1918.*

Section of the recurrent laryngeal nerve, or ligation with linen, chromic or plain catgut produces a complete paralysis which in all probability will be permanent. Stretching of nerve for a short time does not impair the function of the vocal cords; stretching for a longer time does. Pinching of the nerve with a hemostatic forcep produces a temporary paralysis; the length of time for restoration depends on the anatomical point caught. The time generally necessary varied between thirty and sixty days. Exploration of the nerve produces an effect which corresponds to the character and degree of the trauma.

The Modern Treatment of Empyema by Antiseptics.

R. A. STONEY, Dublin, *British Medical Journal, February 16, 1918.*

1. Most if not all cases of empyema can be cured without resort to such mutilating and dangerous operations as thoracoplasty and pulmonary decortication, because it is not necessary to obliterate the pleural space, but merely to render its walls sterile, and this is possible by frequent washings with hypochlorite solutions.

2. Flushing of the pleural cavity with hypochlorite solution is not dangerous provided there is a free exit for the fluid, as by the use of a double drainage tube.

3. The earlier this treatment is instituted the sooner and more surely will a cure be obtained, as there will be less formation of granulation and scar tissue, and the organisms will not have had time to entrench themselves deeply

in the tissues, and will therefore be more exposed to the action of the antiseptic.

4. The drainage should be free, and the opening should not be valvular; if a Carrel tube is used it should be introduced as far as possible into the pleural cavity through a large drainage tube, so that the fluid, starting at the most remote part of the septic space, passes down over its walls and escapes freely between the Carrel tube and the drainage tube.

5. The opening is most suitably made by removing one inch of the eighth rib in the scapular line, as this is the most dependent spot for practically all positions, and there is no fear of its closure by the rising diaphragm.

Treatment of Infected Wounds With Special Reference to the Carrel Method. W. C. BORDEN, *International Journal of Surgery, March, 1918.*

The greater number of infected wounds in which the organisms are accessible are susceptible of sterilization and when rendered sterile will heal more quickly, and may be united or grafted in the same way as fresh operative wounds. The Carrel-Dakin method, while not ideal, is workable and, being the best available, should be employed wherever there is an infected wound.

Les Aneurysmes Arterio-Veineux en Chirurgie de Guerre. (Arterio-Venous Aneurysms in War Surgery.) EMILE FORGUE, *Revue de Chirurgie, July-August, 1917.*

There have been a greater number of these injuries in the present war which have been produced by missiles making a tangential wound of both artery and vein, or by perforating one and wounding the other. The aneurysm is sacculated or circoid and ultimately causes disturbances; operation is done prophylactically. Occasionally, an operation can be done immediately and consists of exposing the area, clearing out the clots and suturing the openings in the vessels. The best time for deferred operation is at the end of the fourth week. The exact level is determined from the trajectory of the missile, the point of maximum swelling, or of maximum thrill and bruit.

The following methods have been found ineffectual: methods of coagulating the blood in the sac; ligation of the artery above; ligation of the artery above and below, except in selected locations.

Effectual methods include quadruple ligation of vein and artery; quadruple ligation with extirpation of the sac; conservative operations including (a) separation of the artery and vein, excision of the communicating sac and closure of the openings by suture, (b) ligation of the communicating path, (c) transvascular obliteration of the communicating opening, (d) sacrifice of the vein with retention of the artery, and (e) end-to-end suture after extirpation with or without transplantation of a segment.

The complications are secondary hemorrhage and gangrene. In successful cases, edema may develop when the lesion is in the lower limb.

Fascia Transplantation Into Lateral Defects of the Major Arteries. HAROLD NEUHOF, *Surgery, Gynecology and Obstetrics, March, 1918.*

Fascia transplants are best because they are universally and easily obtained, and the technic of the operation is feasible in the hands of one not expert in blood vessel surgery. The results of the experiments of Neuhoef indicate that these transplants fulfilled all the desired requirements. The outcome was good, practically, and poor, histologically. In the majority of the experiments the results were satisfactory.

Syphilis of the Heart and Aorta. BRYCE W. FONTAINE, *Southern Medical Journal, April, 1918.*

Syphilis of the aorta is seen as an elevated area which is well defined, pale gray, translucent. The section shows the same characteristics and in the media one can see opaque yellow streaks and patches running the length of the section. These may be conglomerated into patches. The disease is most frequent in young adults. The special symptoms include pain, dyspnea, and fever. The disease results in myocarditis, aortic insufficiency and aneurism.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

SEPTEMBER, 1918.

No. 9

LEUCOCYTOSIS OF THE SPINAL FLUID IN THE DIAGNOSIS OF MENINGITIS.*

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NEW YORK.

I desire to present a few observations and refer to several cases, bearing upon the value of the count, numerical and differential, of the spinal fluid cells, as furnishing evidence in the diagnosis and management of various complications of purulent otitis media.

The spinal fluid normally contains somewhat under ten cells to the cubic mm., and these are lymphocytes with perhaps an occasional endothelial cell. There should be no polymorphonuclear cells. A rather large number of diseases are capable of increasing the number and changing the character of these cells. Nevertheless when, following a purulent middle ear process, one has clinical evidence of, or has reason to expect, meningeal involvement, the change in the kind and number of leucocytes of the fluid obtained by lumbar puncture, in conjunction with certain chemical tests, affords valuable evidence. In such cases, however, if syphilis is excluded, one seldom will make a mistake in attributing the leucocytosis to the process complicating the otitis media.

Considered from an otological standpoint, the presence of an increased leucocyte count with substantial polymorphonuclear percentage, indicates that an inflammation exists either within the meninges themselves or in their immediate proximity.

It is evident that if the subdural space has become generally infected one of the products of inflammation, that is pus, will be found in the cerebro-spinal fluid. In the first stages the cell count will be low and will mount more or less until, as death approaches, it may be well into the thousands. The polymorphonuclear percentage also increases, to above 90 per cent. in some instances. If, however, the process becomes circumscribed, the cell count will not mount so rapidly unless the barrier adhesions give way and the process becomes general. The fact that the meningitis can become circumscribed, although quite extensive, accounts for some reported instances of death from meningitis, veri-

fied post mortem, with normal spinal fluid. Thus the process has been sufficiently extensive to result in a fatal termination from changes in the brain cortex, absorption of toxins, etc., without extending to the spinal system or allowing the products of inflammation to reach the lumbar enlargement.

In the other group of cases, the inflammatory process is in immediate proximity to the cerebro-spinal spaces, which may not be invaded by bacteria. Leucocytes may migrate into the spinal fluid as they do into the tissues in the neighborhood of any severe inflammation. This explanation, I believe, accounts satisfactorily for many of the cases of so-called serous meningitis which we observe. As the serum also finds its way along with the white blood cells into the cerebro-spinal fluid, it is customary to find in these patients a positive serum globulin test. As instances of processes which may bring about this condition may be mentioned brain abscess, extradural abscess, sinus thrombosis and labyrinthitis.

In brain abscess the increase in cells and the amount of cerebro-spinal fluid undoubtedly is often caused by the approach of the abscess cavity to the cerebral cortex. This allows the migration of white blood cells and the transudation of serum into the cerebro-spinal spaces. This will especially occur in non-capsulated abscesses, and in those in which there are no limiting meningeal adhesions. In abscesses of the brain substance other factors doubtless may be responsible for the leucocytosis and increase of spinal fluid. If the abscess approaches the lateral ventricle—all located in the temporo-sphenoidal lobe are almost of necessity in proximity to the ventricle—the above process may affect primarily the fluid within this cavity, and secondarily the general cerebro-spinal fluid through the canal system of the ventricles. That is, from the lateral through the foramen of Monroe to the third, the aqueduct of Sylvius to the fourth, and out through the foramen of Majendie. Moreover, it is not at all impossible that the abscess itself may produce an effect upon the choroid plexus in the ventricle of the side involved, and as these structures are generally recognized as being connected with the production of the cerebro-spinal fluid, it is in no way unreasonable to suppose that this sort of involvement of the ependyma might result certainly

*Read before Otological Section, N. Y. Academy of Medicine, May, 10th, 1918.

in the increase of the fluid, perhaps also in the amount of its cellular constituent.

In connection with the canal system of the ventricles, a fact may be called to your attention which is not at all new, and that is that a cerebellar abscess may cause sufficient pressure upon the posterior part of this system to prevent the drainage of the lateral ventricles, thus producing a sort of internal hydrocephalus. In one patient, in whom the symptoms were obscure but evidently pointed to a brain abscess, exploration of the temporo-sphenoidal lobe gave exit to fluid under marked pressure, the ventricle being entered at much less depth than normal. This led to the recognition of the location of the primary process and the evacuation of a cerebellar abscess.

In inflammation adjacent to and involving the external layers of the dura, which later extend to the meninges, there is often no doubt a stage of varying length, while the products of inflammation are escaping into the subdural space, which antedates the invasion of this space by the bacteria causing the process. In this stage there may be found in the spinal fluid the serum globulins in abnormal amount, or besides these in increased leucocytosis. Meningitis recognized in this stage responds to treatment. A case among several in illustration may be cited:

The patient, a girl about seven years of age, was under the care of Dr. Bowers at St. Luke's Hospital. She had symptoms of meningitis with spinal fluid showing a cell count well into the thousands to the cubic m.m. A mastoid operation with the evacuation of a large extra-dural abscess resulted in recovery. If, in such patients, after evacuating the extra-dural abscess, there is no improvement after twenty-four or forty-eight hours, and especially if the spinal fluid culture should be positive, incision of the dura doubtless offers the best prospect of any interference.

As illustrating the effect of an infective focus in the venous sinuses, I may allude to a case of Dr. Kahn's which was reported before this Section last winter, and which, so far as I know, is unique.

The patient, an adult male, had a mastoid operation and jugular resection. The sinus was explored, free bleeding obtained from below, but the upper end for some reason was not interfered with, leaving this clot in situ. He did very well for three or four days, when symptoms of meningitis developed—headache, delirium, fever, etc. The spinal fluid taken at that time was reported upon by Dr. Dixon as follows: "Spinal fluid-pus," so great was the number of leucocytes, and yet this patient

made a complete recovery upon removing the clot which had been left in the torcular end of the sinus. Notwithstanding this apparent exception, I believe it is a rule that the greater the cell count and the higher the polymorphonuclear percentage, the more serious is the condition. The exception in this case was perhaps due to the thinness of the internal wall of the sinus, which allowed the migration of leucocytes in enormous numbers. Why bacteria did not also escape and institute a general meningitis seems to be a stroke of fate, fortunately of the beneficial kind.

The labyrinth, as is well known, offers the most frequently travelled route for infection from the middle ear to the meninges. The question naturally arises if there may not be, in many instances, a period after the development of a purulent labyrinthitis and before general bacterial invasion of the meninges, when the spinal fluid will show the imminence of this occurrence. If so, it would be of paramount importance from the standpoint of treatment, as it represents the latest point of time in which we can reasonably hope that operative interference will be successful. I do not wish to be understood to advise postponement of the labyrinth operation until there is a leucocytosis of the spinal fluid. But if one chooses to adopt the so-called "conservative" treatment of purulent labyrinthitis, in the hope that it will pass into the latent stage and cause no more trouble, one surely should not wait after the spinal fluid begins to show changes, although to be fair I will later refer to a case pointing otherwise. First, however, I desire to refer briefly in two cases bearing upon the leucocytosis associated with labyrinthitis:

An adult male, upon whom I performed a radical operation, developed purulent labyrinthitis on the following day, with total deafness, nystagmus, vertigo, etc. The spinal fluid taken fourteen hours after the onset of the vertigo and nystagmus, showed a cell count of 145, the polynuclear cell percentage above 60. Labyrinth operation with opening of the internal auditory meatus and removal of the modiolus was done a few hours later. The patient lived and is alive today after more than two years—a healthy man although minus the function of one ear. The culture and complement fixation test for syphilis were both negative.

Another patient, whose case I propose to report in full later, had all of the symptoms of meningitis following a purulent labyrinthitis of about a month's standing. Examination of the spinal fluid showed 15 leucocytes, with a few polymorphonuclear cells. On the following day the laboratory report was

512 cells with polynuclear percentage of about 60. Labyrinth operation and decompression cleared up the meningitis, although the patient died four months later with obscure symptoms of some intracranial lesion. His spinal fluid, however, remained normal to the end. I felt that my operation in these two patients was timely and well adapted to the requirements, and I still feel so, notwithstanding the following case:

Following a radical operation there developed a purulent labyrinthitis with an abnormally high cell count of the spinal fluid, with a substantial polymorphonuclear percentage, and although no operation was done the patient recovered. This case evidently shows that it is possible, even after the spinal fluid has shown a meningeal reaction to an offending labyrinth, for the process to become walled off by barrier adhesions and pass into a quiescent or latent stage. To postpone the operation of labyrinthectomy, expecting such an outcome in an instance of this kind, is, however, the very absurdity of conservation.

We thus see that the leucocyte count of the spinal fluid is able to give us early information concerning a patient in whom we are fearing the onset of meningitis, and that at a time when treatment of a surgical nature may be undertaken with a prospect of success. Whether or not the determination of the presence, number, or percentage of the polymorphonuclears alone would do this I am unable to say. I do know, however, that through many years the reports from the laboratory have come in the form of the total count, together with the polymorphonuclear percentage, and that I have found these reports very satisfactory and would not readily forego the information gained from the total count. From this one forms an idea of the intensity of the process, and as the disease progresses the count offers a good, if not the best, indication of its favorable or unfavorable tendency. This does not hold true if fluid for the purposes of medication has been injected into the lumbar sac. Serum or other liquid preparations tend to dilute the spinal fluid, and on a subsequent puncture the leucocyte count may be less, although the disease is progressing unfavorably.

The report on the cells in conjunction with the result of the globulin test comes very soon after the fluid is withdrawn, and operation may be instituted without waiting twenty-four or more hours for the report of the culture, which may or may not be positive in a case of purulent meningitis.

I have had two patients, whose meningitis ran to a fatal termination, one confirmed by autopsy, the other with a typical history, in neither of whom did

the spinal fluid give a positive culture, although numerous specimens from each were cultivated.

The greatest difficulty often arises in making a cell count of the spinal fluid that will be of value when there is admixture of blood. In an instance of this sort the test for the globulin is, of course, strongly positive, and one usually relies on the culture. Two instances in this connection may be mentioned.

In the first, the diagnosis of meningitis was verified by autopsy. Clinical history obscure. Blood in spinal fluid from three punctures made at intervals. Fehlings positive. Culture negative. Dr. Dixon thought the fluid obtained at the first puncture showed leucocytes out of proportion to the red blood cells as found in the patient's blood.

In the second, the patient was convalescing from meningitis when a temperature of 103 deg., with severe headache, influenced me to have the spinal fluid taken. Blood was drawn with the fluid. After comparing the differential count of the fluid with that of the patient's blood, I concluded that those symptoms were not caused by a recrudescence of the meningeal process, and subsequent progress of the case established the accuracy of this opinion.

In conclusion I would say that one should always be on the lookout for other diseases which give a leucocytosis of the spinal fluid, especially syphilis in its various forms. All laboratory reports should be considered as aids to clinical observation. Viewed in this light, I regard the cell count of the spinal fluid, with the determination of the polymorphonuclear percentage, as one of the most important laboratory aids in the diagnosis and management of meningitis.

HOOKWORM

Hookworm disease has long been known in the mines of Wales, Germany, Netherlands, Belgium, France and Spain, and in the United States has been reported from mines in Nevada, North Carolina, Tennessee, Kentucky, West Virginia and California. Since no complete survey of the mining regions of the United States has been made, it is very probable that hookworm is also present in other states besides those mentioned. Effective campaigns against hookworm disease in mining regions have been carried on in a number of European countries. Germany reduced the infection in 30,000 miners in ten years from more than 30 per cent to less than 1 per cent. California is the only state in the United States which is carrying on an organized campaign against hookworm disease among miners.

—C. A. KOFORD, in *Bulletin California State Board of Health*.

BLOOD TRANSFUSION WITH A CONSIDERATION OF ITS INDICATIONS AND LIMITATIONS.

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The marvelous results obtained by blood transfusion in cases of acute anemia with impending death, following hemorrhage due to pathologic erosion of vessels or operations, have stimulated the hope that in this procedure we would have a therapeutic weapon of immense power, in many important diseases.

The therapeutic possibilities of transfusion in such diseases as progressive pernicious anemia, the leukemias, pulmonary tuberculosis, typhoid fever, cancer, etc., were soon magnified; and a large number of transfusions have been performed the world over, for the most varied indications, ranging from hemorrhage to tuberculous arthritis and from jaundice to pale cheeks. It is not to be forgotten that much of this transfusion furore took place before many facts had been established about the compatibility of bloods, and it may be surmised that many deaths and other unfavorable results must have occurred before the relations of blood groups began to be understood.

Before considering the methods of blood transfusion, I shall briefly discuss its therapeutic indications and limitations, and close with a brief discussion of the relative value of the methods in vogue.

Blood transfusion in the treatment of acute anemia and hemorrhages. It is impossible to deny the marvelous results of transfusion in these conditions. The procedure has been equally satisfactory in shock following hemorrhage, and in the hemorrhagic diathesis. If the transfusion in these cases is made with blood of the same group as the patient, the transfused blood may assume the physiologic functions of gaseous interchanges, of nutrition and elimination, but full scientific confirmation of this fact is yet to be obtained. As to its employment in the hemorrhagic diathesis, or for the control of hemorrhages in general, I feel inclined to dismiss the subject with the statement that transfusion is both unnecessary and unwarranted, when we consider the uniformly marvelous results obtained from the employment of normal horse serum, or better still from the active hemostatic principle isolated from serum. Transfusion therefore in the treatment of hemorrhage is to be considered when neither a fresh serum nor a coagulating agent of value is immediately obtainable.

The obvious advantage of such agents over transfusion needs no further affirmation.

Transfusion has been satisfactorily employed in cases of poisoning by illuminating gas and carbon monoxide. In these cases much hemoglobin is destroyed by the formation of C O methemoglobin.

Crile,¹ has resuscitated by transfusion several patients practically dead from these causes.

Transfusion has been largely employed in the treatment of several infectious diseases, namely, scarlet fever, septicemias. Though there have been reports of improvement, I can give very little encouragement to this practice. Whatever may be gained by transfusion is certainly surpassed by our other modern therapeutic measures.

Delbet² and Lilienthal³ have suggested transfusion in typhoid fever, advising that the blood be obtained from a donor having an acquired immunity to the disease, hoping to transfer immune bodies to the patient. Little evidence of the value of the procedure has been obtained.

Dorens and Gingsberg⁴ have wisely called attention to the contraindication of transfusion in many hemolytic disorders, such as hemolytic jaundice and hemorrhagic pupura.

Numerous transfusions have been performed for pernicious anemia, splenic anemia (Banti's disease), leukemias, and Hodgkin's disease, and it is doubtful whether any remarkable benefits have resulted. Whatever improvement has been noticed has been transitory, and in no instance equal to that obtained from other therapeutic measures of proven value.

Methods of Transfusion. Transfusion of blood can be accomplished either by direct or indirect methods. The direct methods evolved are very numerous. The aim has been to connect the vessel of the donor, preferably the radial artery, to the median basilic or median cephalic vein at the elbow of the recipient. The artery to vein method is much to be preferred to a vein to vein technic, inasmuch as the positive pressure of donor's heart will assure a quicker transfusion; also in transfusing arterial blood, one gets a vital fluid containing less carbon dioxide and more oxygen with a minimum of waste products. In an exsanguinated, moribund patient, this point is of great importance. Of the many appliances for direct blood transfusion, such as Crile's canula, Carrell's suture method, Elsberg's canula, Brewer's tubes, etc., I prefer Bernheim's transfusion tubes, and Soresi's canulas.

Bernheim's tubes are very useful and simple and transfusion by this method requires very little labor. The superiority of Soresi's method (2)

seems to be unappreciated. This method enables one to make an end to end anastomosis of artery to vein, with a perfect apposition to the endothelial surfaces, eliminating all danger of failure by coagulation of blood in the canula, since the blood does not pass through any foreign body. The objections to the method are chiefly relative to the requisite technical skill necessary. Indeed, the rather complicated technic has prevented the method from becoming very popular.

The direct methods of transfusion are slowly but steadily giving way to the indirect methods. The advantages of the indirect method are very obvious, especially as it permits the control of the dose of blood transfused. Serious difficulties, relating principally to the coagulation of the blood out of the vessels, have had to be overcome, before the indirect methods could become of great advantage.

Indirect Methods. The attempts to transfer blood through the intermediate use of a carrying vessel is quite an old one. Francesco Folli (1652) described a plan of transfusion, using two canulas with the intermediate agency of a piece of intestine or blood vessel. Credit for the first transfusion is given to Richard Lower of Oxford in 1666.

Numerous appliances have been devised for indirect transfusion, and very few of them possess the desideratum of simplicity. The use of all these appliances require numerous manipulations and the possible danger of minute coagula forming in the transfused blood cannot be always obviated. The modern syringe canula methods, such as that of Von Ziemssen and Moritz⁵ and also of Lindemann,⁶ while representing a step forward from some of the older complicated methods, do not represent an ideal method of indirect transfusion for the reason set forth above. Satterles and Hooker⁷ have advocated a very ingenious method, using paraffin coated canulas having an extra neck, which is connected to a cylinder containing saline solution, that is used to prevent the coagulation of blood in the canula, until the paraffin coated cylinder containing the blood to be transfused is connected to canula.

Of all these methods I give preference to the one of Kimpton-Brown⁸ and especially to the later method described by Percy⁹. If one will follow the rules laid down by Percy he can transfuse blood easily and safely, with or without the use of any anti-coagulants.

Transfusion with the use of anti-coagulants in the physiological laboratory is very old. Sodium citrate is extensively used for this purpose. Lewisohn¹⁰ who has been advocating indirect trans-

fusion, using sodium citrate, has found that it is necessary to add sodium citrate up to 0.2 per cent. to the total volume of blood transfused to inhibit coagulation. Sodium citrate acts by making an insoluble compound with the calcium of the blood. If a sufficient amount of citrate has been used coagulation can be entirely prevented, as the process of clotting is entirely paralyzed, when the normal calcium ion concentration of the blood is disturbed.

Leech extract (hirudin) has been advocated as an anti-coagulant, since exceedingly small amounts are sufficient to inhibit coagulation. Morawitz¹¹ and Mellamby¹² have demonstrated that hirudin is not only directly antagonistic to prothrombin, but is especially active in the neutralization of the thromboplastic substance indispensable in the coagulation process. The employment of hirudin as an anticoagulant seems to possess theoretical advantage over the citrate method. I do not hesitate to say that this advantage is of very slight value. The citrate method is certainly admirably safe and simple. Even when using this method I prefer to collect the blood in a paraffined cylinder, preferably Percy's transfusion tube. With this method the paraffined canula neck of the tube can be easily introduced into the vein of the recipient and the blood does not come in contact with any rubber tubing, metallic needles, etc. It is also easy to secure the blood from the donor thus. Of course the avoidance of contact of the citrated blood with rubber tubing, needles and etc., is not entirely necessary and one may transfuse blood by the method of Lewisohn, using a gravity apparatus. This makes the operation as simple as the administration of a saline infusion.

Blood groupings and the selection of the donor. The selection of the donor is of paramount importance. Aside from the consideration of health and freedom from luetic infection, which should always be ascertained by a Wassermann test. It is necessary that the compatibility of the donor's blood with that of the recipient be always assured.

The donor's corpuscles may be agglutinated by the recipient's serum or in turn the serum of the donor may agglutinate the corpuscles of the recipient. In either instance the transfusion of such incompatible blood will be followed by most alarming symptoms and not infrequently by death. The phenomenon of agglutination is very often present with that of hemolysis, depending upon the presence in the blood of iso-hemolysins, together with the iso-agglutinins. As pointed out by Moss¹³, iso-hemolysins never exist in blood without the presence of iso-agglutinins, but the latter are often

present in the plasma of the former, so I believe that it is unnecessary to test for hemolysis and that the test for the presence of iso-agglutinins is the determining factor in the selection of the donor. Through the classical researches of Moss (loc. cit.) human blood has been divided into four groups, according to the behavior of the agglutinating reactions. A knowledge of this grouping is very invaluable in obtaining blood from professional donors. Knowing the group to which the donor belongs, it will only be necessary to ascertain the patient's group.

AGGLUTINATING REACTIONS OF HUMAN BLOOD	
GROUP I. (MOSS).	GROUP II.
<p>Serum of this group agglutinates corpuscles of group 1 and 2.</p> <p>Corpuscles of this group are not agglutinated by serum of groups 3 and 4, nor of 1 and 2.</p>	<p>Serum of this group agglutinates corpuscles of group 2 and 3.</p> <p>Corpuscles of this group not agglutinated by Serum of any group.</p>
GROUP III.	GROUP IV.
<p>Serum of this group agglutinates corpuscles of group 3 and 4.</p> <p>Corpuscles of this group not agglutinated by Serum of any group.</p>	<p>Serum of this group agglutinates corpuscles of group 1 and 2.</p> <p>Corpuscles of this group not agglutinated by Serum of any group.</p>

CONCLUSIONS.

Blood transfusion is unquestionably a life saving procedure in acute anemia and after severe hemorrhages.

In cases of suspended animation due to poisoning from illuminating gas, it is unquestionably the most useful therapeutic agent at our command.

In the treatment of leukemia and pernicious anemia, transfusion is necessary to improve the patient's general condition, thereby gaining time for other therapeutic measures.

The field of blood transfusion should be limited to its proper indications. A large number of transfusions, made the world over for most diverse affections, ranging from carcinoma to chronic arthritis, has sufficiently established that blood transfusion is not a panacea for most human ailments.

The indirect method of transfusion with sodium citrate as an anti-coagulant is certainly the most simple and efficient manner to transfer blood from one individual to another, and bids fair to supersede all other methods.

The selection of the donor should be made with painstaking care, both as it pertains to the isoagglutination reaction, and to the absence of luetic infection.

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EXTRA-UTERINE PREGNANCY. ITS DIAGNOSIS AFTER RUPTURE FROM OTHER ACUTE PELVIC LESIONS.*

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Everyone knows the importance of making a correct diagnosis of extra-uterine pregnancy, especially in those fulminating cases, when only heroic and prompt surgical interference will save a patient's life. I think it is important to make a correct diagnosis of intra-abdominal lesions rather than to rely on an exploratory operation. In these days of progress there is little excuse for making a mistake; and if we fail to make a correct diagnosis, the fault may be found in a lack of systematic utilization of all the diagnostic factors made available through medical research.

A complete and correct history is of primal importance. Simple as this sounds there are frequently difficulties that threaten accuracy. Especially is this the case among the unmarried, where for the sake of protecting her character, the patient may not only refuse information but may try to mislead the questioner. Firmness and diplomacy are required to ascertain the true facts upon which the prognosis must depend. In the pre-ruptured stage the diagnosis is often impossible if the history is incorrect.

In the beginning, extra-uterine pregnancy—better called tubal pregnancy, because with few exceptions the primary pregnancy is always in the tube—does not present any symptoms other than those of a normal intra-uterine pregnancy. Only when the

*Read before the Milan County Medical Association at Temple,

No. 1.—Crile, G. W., Hem., and Trans. D. Appleton & Co., 1908—II.11—18.

TEXAS, JUNE, 1917.

first symptoms of a stretched tube appear as excruciating pains followed by collapse varying in degree according to the amount of blood lost does an extra-uterine pregnancy ordinarily come into the hands of a surgeon. The history of extra-uterine pregnancy is almost classical. The patient will be amenorrheic for two months, or more commonly, one or two weeks after missing one period, a slight bloody discharge will occur, which is less than the amount arising from a normal menstruation. This discharge will be accompanied by a variable degree of pain.

The first differential diagnosis will be between intra-uterine abortion and a ruptured extra-uterine pregnancy. The pain in intra-uterine pregnancy with beginning abortion comes on gradually and is of a bearing down character. The patient complains of backache at first and later of a constant seemingly pressure, forcing everything into the vagina. The pain in beginning abortion is generally referred to as being in the pubic region in the middle line. In ruptured extra-uterine pregnancy the pain is excruciating, of a stabbing character and is followed by fainting and collapse. The collapse will depend upon the amount of intra-abdominal bleeding. In case the rupture takes place between the folds of the broad ligaments, the bleeding will not be very extensive and the symptoms of intra-abdominal bleeding will not be very pronounced. The pain, however, is of the same, sudden and excruciating character and shock will be present. The patient describes the pain as knife-like and cutting and always refers it to either the right or left side and not to the midline. This is of great diagnostic importance. The pain gradually disappears and gives place to a general soreness spreading over the whole lower part of the abdomen. The presence or absence of decidua is of importance in the diagnosis and any expelled membranes should be examined for villi. Frequently one notes the expulsion of pieces of decidua, and I have observed in one instance a regular cast coming away from the uterine cavity.

It must not be forgotten that there is no relation between the loss of visible blood and the amount of shock and the symptoms of hemorrhage. The patient may get over one attack without consulting a physician, recover for the time being, and in a short time the colicky pain recurs. The bloody discharge is not a constant symptom, and if the patient gives a history of repeated colicky attacks there frequently is freedom from a bloody discharge after the first colicky attack.

The vaginal examination discloses a soft boggy

uterus, which in size does not equal the normal enlargement due to intra-uterine pregnancy. The cul-de-sac may feel boggy to the touch, giving a peculiar sensation as if one's fingers were stuck into putty. The uterus generally can be outlined by the examining fingers and a mass detected to one side of it. If it is impossible to make a proper bimanual examination on account of the resistance of the patient, an anesthetic is essential for a thorough examination. Percussion of both flanks of the abdominal wall may reveal dullness, but only after repeated or severe hemorrhages. In a primary rupture of the tube with hemorrhage into the free peritoneal cavity the blood sinks down into the smaller pelvis and into the cul-de-sac and, therefore, no flatness can be noted upon percussing the lower abdominal wall. After repeated hemorrhages one

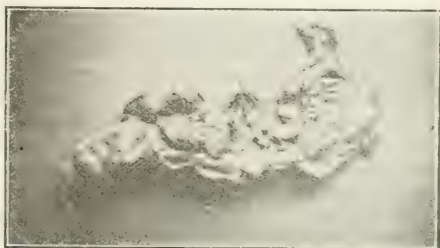


Fig. 1. Ruptured extrauterine pregnancy. Removal of tube and cystic ovary.

finds flatness, always irregular in outlines with one side higher than the other. The side containing the ruptured tube will always show the higher flatness. I recall a patient in whom the dullness reached into the region of the gallbladder. This case is of such interest that I thought to report without going too much into details.

A young unmarried woman of 26 years complained of pain referred principally to the region of the gallbladder, and a physician diagnosed the condition as an attack of gallstone and advised operation. There was flatness reaching into the right hypochondrium and becoming continuous with the liver dullness. By careful percussion I could differentiate the relative dullness from the absolute flatness of the liver. The patient refused absolutely to give a full history. All the symptoms pointed to intra-abdominal hemorrhage and a blood examination showed a primary anemia. After entering the hospital, a second blood count was made one hour after the first count and this showed a decrease of the erythrocytes and hemoglobin. The diagnosis was supported and an immediate laparotomy was performed and a ruptured right tube was found

the tube was ligated and removed; most of the bloodclots were removed and the abdomen was closed without drainage. There is no need to completely empty the peritoneal cavity, inasmuch as the extravasated always will be absorbed. Drainage is unnecessary. Nature will take care of the free blood in the peritoneal cavity and drainage of an aseptic field only invites infection.

If a patient shows all the symptoms of internal hemorrhage, such as being nearly pulseless, restless, with pale face and blanched lips, having air hunger and compression of the arm, shows that the veins that do not become filled, prompt action is imperative. No other condition exhibits a more clear cut picture. Ruptured extra-uterine pregnancy should always be borne in mind even though it is impossible to secure a corroboratory history of the case. The one symptom to be recognized as pathognomonic of internal hemorrhage is restlessness. In shock this restlessness does not occur. It occurs in general peritonitis, but as general peritonitis does not begin as a ruptured extra-uterine pregnancy does, differentiation is simplified. I remember another instance when a physician had curetted a patient a few hours before I saw her. I found a typical picture of intra-abdominal hemorrhage and a few minutes later, before I really finished my examination, she expired. The necessity of accurate diagnosis was impressed upon me.

Another factor to be considered in the differential diagnosis is an acute attack of pyosalpinx with extrusion of septic material through the ostium abdominale of the Fallopian tubes. The pain in those cases is very severe and similar to that due to a rupture. There are symptoms of severe shock from pain, but no symptoms of internal bleeding. The history and the symptoms of inflammatory involvement of the peritoneum will aid in establishing a correct diagnosis. In cases of ruptured extra-uterine pregnancy unless the hematocele becomes infected, the palpitation of the abdominal wall is less sensitive than in infected cases. There also develops a rapid leucocytosis, which can be studied from hour to hour. In ruptured extra-uterine pregnancy this rapid leucocytosis does not develop and the blood picture shows a simple secondary anemia. It is important to study carefully the relationship between the erythrocytes and the hemoglobin by repeated blood examinations. Vomiting also arises in ruptured extra-uterine pregnancy, but is due to the shock and does not correspond with the vomiting due to a septic condition in the peri-

toneal cavity. Signs of peritonitis come on rapidly in pyosalpinx, but not in ruptured extra-uterine pregnancy.

It is very important to make the differential diagnosis because of the high mortality connected with operations during the acute stage of pyosalpinx.

A sloughing myoma involving the uterine mucosa must be considered in the differential diagnosis, but the nature of the pain, the absence of shock and absence of symptoms of internal hemorrhage will aid one in forming a correct diagnosis.

Intra-uterine angular pregnancy, with beginning abortion, may sometimes simulate ruptured extra-uterine pregnancy. The pain will be not over the pubic region, as in normal abortion, but will be either right or left sided. Symptoms of internal bleeding are missing, blood examination will not

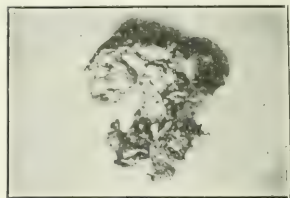


Fig. 2 Ruptured extra-uterine pregnancy with rupture into the broad ligament.

give the picture of secondary anemia; and the bimanual examination will very clearly demonstrate the position of the pregnancy by outlining the wall of the uterus. The whole mass may be lifted between the two hands; and the continuation of the uterine wall laterally and the absence of any infiltration outside this mass will confirm the angular pregnancy. The same procedure holds true for a retroverted pregnant uterus. With a retroflexed gravid uterus the dysuria is noteworthy. Bladder symptoms are always absent in the beginning of extra-uterine pregnancy and only become manifest when an accumulation of bloodclots takes place in the free peritoneal cavity.

The differential diagnosis between ruptured extra-uterine pregnancy and acute appendicitis is not difficult if one follows the history systematically and studies the cardinal symptoms in their relations. In an attack of acute appendicitis, as a rule, the pain is first felt either in the epigastrium, switching over to the right inguinal region, or the pain may begin directly in the right inguinal region. Nausea and vomiting, sometimes only nausea ensues. Third: Tenderness to pressure over the right iliac region. Fourth: Rigidity of the abdominal muscles, fever and leucocytosis. In appendicitis there is almost

always a rise of temperature, depending on the amount of infection and the absorption of toxins under pressure. The rise of the temperature in ruptured extra-uterine pregnancy does not take place as rapidly and only after some absorption of the bloodclots. In appendicitis the differential blood count gives the polynuclear picture of infection.

The Abderhalden test is positive and usually more marked and earlier than in intra-uterine pregnancy. This test should be regarded as an auxiliary and not as a pathognomonic symptom. Because of the time element in a fulminating type of ruptured extra-uterine pregnancy—the laboratory report cannot be awaited. In the April, 1917, issue of *Surgery, Gynecology and Obstetrics*, Rubin presented a very interesting clinical and pathological study of cases simulating extra-uterine pregnancy which proved to be retention cysts of the ovary.

Pregnancy in a bicornuate uterus may simulate extra-uterine pregnancy, but a careful examination of the patient under a general anesthetic together with the complete history will lead to the proper diagnosis. A perforated gallbladder or a gastric or duodenal ulcer, a ruptured appendix, a ureteral stone or nephrolithiasis may simulate a ruptured extra-uterine pregnancy, but careful analysis of symptoms should establish the true condition. It is the systematic study by elimination of other pathological conditions which result in the correct diagnosis.

Another pathological factor which may simulate ruptured extra-uterine pregnancy is an ovarian cyst with a twisted pedicle. To illustrate, I may record the following recent case:

An unmarried woman previously healthy, save for dysmenorrhea, had not noticed any enlargement of her abdomen. Her last menses were six weeks before I saw her, though she has been irregular. Four days before I saw her she had a sudden excruciating pain in the left inguinal region, followed by fainting and then soreness all over the lower abdominal region. After the onset of pain the abdomen began to swell very rapidly and was most prominent in the middle line reaching above the umbilicus. This dullness was in the same area as one notes in ovarian cysts and normal intra-uterine pregnancy. There were no colicky pains after the first attack but some soreness. On the third day she had a chill and a rise of temperature. I saw her on the fourth day. There was no discharge from the uterus, nor other symptoms of pregnancy. A general enlargement of the lower half of the abdomen with flatness near the middle line and tympany in both flanks was noted. The

vaginal examination showed a normal cervix without any softening of the uterus. As I could not get any definite outline of the uterus through a vaginal examination, I made a rectal examination and was able to outline it up to the fundus. There was no mass on either side; the cul-de-sac was free and the uterus could be moved freely. The vaginal examination showed a mass to the left of the uterus reaching to the middle line, but without connection between them. The patient did not appear to be seriously ill. The blood picture did show a marked anemia. The sudden onset, the excruciating pain, the sudden swelling of the abdominal cavity, the absence of peritonitis, the negative history of infection, led to a tentative diagnosis of an ovarian cyst with a twisted pedicle. The blood examination showed 74 per cent. hemoglobin, 3,100,000 erythrocytes, and 20,000 leucocytes. The differential count was negative. There was no external bleeding. I came to the conclusion, therefore, that bleeding must have occurred into the cyst. A gangrenous condition of the pedicle caused by a complete twist cut off the blood supply and caused a sloughing of the walls of the vein with a resultant effusion of blood into the cyst. The diagnosis was confirmed by an operation.

In conclusion I wish to reiterate: the diagnosis of a ruptured extra-uterine pregnancy is possible in every instance, if there is a systematic and thorough analysis of all the facts, conditions and symptoms. The history of the case, the laboratory findings, the physical examination of the patient must harmonize to ensure accuracy in diagnosing ruptured extra-uterine pregnancy.

CONTRAINDICATIONS TO SALVARSAN.

Contraindications to salvarsan therapy may be divided into two main groups:

1. Those to whom the injection may be dangerous on account of the reaction that may follow, as, for example, cases of early cerebral lues with cranial nerve manifestations of an exudative character; also cases of tabes with beginning optic atrophy. In these patients salvarsan or neosalvarsan should be given with extreme caution and only in small doses, and frequent examinations of the eyes should be made.

2. Those with extensive disease of the circulatory system, such as severe uncompensated heart disease, coronary sclerosis, and extensive aneurysm; also cases of diabetes mellitus, severe nephritis, ulceration of the stomach, and advanced tuberculosis or carcinoma.—JOHN A. KOLMER.

OBSERVATIONS ON FRACTURES.*

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In no department of surgery has there been greater variation in opinion than in the management of fractures. The literature affords ample confirmation of the statement that there is yet no consensus of opinion concerning the treatment of fractures. To secure the best anatomic and functional results the method employed must necessarily be one with which the surgeon is familiar.

In studying the apparent reasons for lack of standardization of technical methods in the treatment of fractures the following clinical observations seem pertinent:

(1) The infinite variety of traumatic agencies causative of osseous and integumental damage.

(2) The multiplicity of anatomic situations and the varieties of injury which may be produced by external violence.

(3) The extreme variation in degree of the resulting bony injuries in different localities under circumstances seemingly identical.

(4) The diversity in extent of the injury inflicted upon the overlying integumental, nervous, and vascular structures.

(5) The physical status of the individual when first observed, and the time which may have elapsed since his injury.

(6) The presence of local or constitutional disease which might militate against normal union of the injured, fractured or lacerated tissues.

(7) Finally, the type of the individual fracture and the nature and method of its production must govern the indications for therapeutic procedure.

Obviously corrective or remedial measures must be modified or changed to meet the indications suggested by the foregoing fundamental academic propositions; hence, treatment to be successful must necessarily be strictly individualized, and no general rules can therefore be formulated. At one time the almost universal practice was to amputate extremities involved in compound and otherwise complicated fractures; whereas, under methods in present vogue, amputation is rarely considered excepting where irreparable damage has been inflicted not only upon the osseous, but also the integumental, nervous and vascular tissues.

(1) *Varieties of Trauma:* Fractures may be the result of a thousand different traumatic agencies externally applied, which are familiar to every

surgeon of average experience, wherefore their enumeration is unnecessary. Accidental blows, falls and crushing injuries are the most common causative factors; and any type of simple or complicated injury may be produced by this action.

The probability of fracture from muscular contraction alone, unless the bony structures involved be already weakened by devitalizing disease, such as syphilis or tuberculosis, seems exceedingly doubtful, although many such instances have been recorded. For example, the author of a standard surgical text-book contends that fractures by muscular action are most common at the patella, the bone being broken by the powerful contraction of the quadriceps; in other cases the muscles produce fracture by cross-strain, as of the humerus or femur in spasmodic or voluntary contraction, or of the ribs in coughing, or the sternum during labor; or by tearing off an apophysis to which the muscle is attached, as the coracoid process or the posterior end of the calcaneum; and in others by creating in portions of the body conditions of momentum which act in the same manner as external violence, as in fracture of the humerus by throwing back the head (Keen-White). To the majority of these statements the writer wishes to take decided exception.

Fractures the result of gunshot wounds are observed quite commonly both in civil and military practice. Such fractures are invariably compound in character and usually otherwise complicated, therefore, from a therapeutic standpoint, they should be classified among the most serious types. Fractures the result of ordinary forms of external violence may include every variety known, depending upon the nature of the traumatic agency and the manner of its external application. Blunt and sharp-pointed instruments create entirely different types of injury; hence, the importance of always accurately determining the nature of the traumatic agency.

(2) *Anatomic Situation:* The character and extent of the bony injury from external trauma may vary considerably, because of anatomic peculiarities in the situation where violence is applied. For instance, trauma sufficiently severe to produce metatarsal or metacarpal fracture would not injure more deeply situated osseous structures owing to the protection afforded by the overlying integument; and it naturally follows that violence of sufficient severity to fracture larger and deeper bones, such as the femur, humerus, upper radius and tibia, would cause extensive laceration and crushing of the more superficial tissues. Fractures of

*Read before the Kentucky Medical Association, Louisville, 1917.

the lower ulna, tibia and fibula, the clavicle and ribs, like the smaller superficial bones of the hands and feet, sometimes occur from slight trauma, owing to the thinness of the overlying protective muscular cushion. Crushing injuries in any anatomic situation usually produce comminution of the bony structures accompanied by extensive damage to the overlying tissues.

(3) *Degree of Osseous Damage:* For reasons which no one seems able to satisfactorily explain, the osseous damage from external trauma is seldom uniform in character and degree. There may be great variation even where the traumatic agency, the amount of force applied, the anatomic situation, the age and physical status of the individual, are apparently identical. The skeletal structures of children are not always resilient, nor are those of the aged invariably brittle; but trauma in elderly individuals is usually more destructive to both osseous and integumental tissues than corresponding injuries inflicted during early childhood. It has also been noted that trauma externally applied at different times in identical situations of the same individual may be productive of widely varying results. However, excepting fractures of the cranial vault, this observation refers more particularly to other traumatic damage.

Fractures of the cranium occasionally result from trauma so insignificant as to produce but slight integumental injury; such fractures are usually linear in type and without immediate symptoms. More severe trauma is necessary for the production of basal fractures, and as a rule the resulting manifestations are typical and unmistakable.

(4) *Diversity of Integumental Injury:* The extent of the traumatic damage inflicted upon integumental structures is never an accurate index of bony injury. Extensive laceration of the soft parts may be produced by external trauma without periosteal or osseous involvement. On the other hand, however, certain types of fracture may result from slight trauma without sufficient integumental damage to excite serious attention. Much will depend, of course, upon the character of the instrument by which the trauma was inflicted. Obviously when integumental damage is extensive the nervous and vascular tissues also suffer considerable injury, and unless adequately reconstructed by surgical plastics the functional results necessarily will be imperfect.

(5) *Individual Status:* The physical status of the individual with fracture is subject to the widest variation, depending to a greater or less extent upon the anatomic situation involved, the age of

the patient, and the period which has elapsed since the injury. In the majority of the very youthful, the elderly, and in individuals of any age debilitated by disease, fracture induces shock and other more or less characteristic systemic disturbances; whereas, in healthy and vigorous subjects no such phenomena may be observed. This is a rule, however, to which there are many curious exceptions.

Fractures of the lower extremities may occur from slight trauma during convalescence from certain diseases or surgical operations without producing symptoms of sufficient gravity to attract attention until the patient attempts to walk; fractures of the metatarsal bones may exist unsuspected for weeks under similar circumstances. However in an otherwise healthy subject, the ordinary signs of fracture are usually noted.

(6) *Local or Constitutional Disease:* The presence or absence of local or constitutional disease must be determined before deciding upon the method of procedure in fracture involving any anatomic situation. Local osseous lesions when present must be included in the treatment. Otherwise a favorable outcome cannot be expected. Remote systemic disease may cause sufficient tissue devitalization to retard markedly integumental and osseous reparative processes, therefore general therapeutics must not be neglected in such instances.

In the presence of either local or constitutional disease, tissue reparation may be sluggish, and stimulating agencies must then be employed.

(7) *Type of Fracture:* No two fractures can be properly treated in a manner even approximately identical for the reasons already stated; each may possess distinctive pathologic features which must be considered in deciding upon the most appropriate method of procedure.

No generally applicable rules can yet be formulated, and the personal equation of the surgeon, his observation, experience and individual preference, must govern his manipulative and operative efforts in the reduction of fracture of every type.

Insomuch as standardization of technical methods seems impossible, the treatment of fractures still remains one of the most difficult problems in surgical practice. The objects to be attained permit of no reasonable debate, viz., reduction with perfect maintenance of the fragments, and ultimate union without anatomic deformity or functional impairment; but these desiderata are frequently impossible of accomplishment by any method of management yet devised.

It has been tritely remarked that one failure to secure a satisfactory ultimate outcome will counter-

act the benefits derived from a thousand successful results in the treatment of fractures, and with this observation the writer perfectly agrees. The individual for whom an imperfect outcome is secured is a living witness to the presumed lack of technical skill on the part of the attending surgeon; whereas, those for whom perfect anatomic and functional results are obtained furnish no external visible evidence to emphasize his surgical knowledge and skill.

Since the perfection of modern instruments of diagnostic precision, including the fluoroscope and roentgen ray, the laity has been educated to demand that the surgeon secure something more than fairly satisfactory function in the treatment of fractures of every type. Anatomic deformities following reduction of fractures have been used as the basis of more lawsuits for malpractice than all other causes combined: therefore, regardless of the apparent simplicity of the individual fracture, it is not only the height of wisdom for the surgeon to insist upon competent consultation, but to further fortify himself by having made at least two roentgenographic plates before and after reduction has been accomplished.

To discuss in detail the numerous types of fractures and the procedure most applicable to each, would prolong these observations beyond reasonable limits; but a few outlines may be permitted. There still remains considerable divergence of surgical opinion concerning the merits and demerits, likewise the indications and contraindications, of methods which contemplate the introduction of non-absorbable substances into the tissues for the maintenance of reduction, such as plates, nails, screws, etc., which necessitate a subsequent surgical operation for their removal.

Certain over-enthusiastic followers of Lane have advocated the plating of all fractures, regardless of the type; but more conservative surgeons have wisely hesitated about adopting such radical departures from well-recognized scientific methods of procedure. In my opinion, Lane plates are seldom indicated in the treatment of any type of fracture, and in injudicious or incompetent hands their use may markedly enhance the clinical dangers. Moreover, observation shows that the majority of them have to be subsequently removed because of infection, and in some instances amputation has become necessary as a life-saving measure.

In comminuted fractures of the long bones and in certain complete oblique fractures where reduction cannot be otherwise maintained, open operation with application of kangaroo tendon or silver

wire to hold the fragments in correct apposition will usually meet all the indications. If preferred, the "gimlet method" devised by Dr. H. H. Grant, of Louisville, Kentucky, may be used. Where any mechanical fixation apparatus seems necessary, I believe the "gimlet method" or some of its modifications should be given preference. The autogenous bone inlay will be found most satisfactory in properly selected cases. Open operation should never be performed, however, where approximation of the fragments can be maintained by the closed method. During the open operation, of course, all unattached bony fragments should be removed.

In the after-treatment of fracture for obvious reasons it is important that prolonged joint fixation be avoided. The early application of heat, gentle massage, and mild passive motion will be found beneficial in all instances. However, early vigorous active movements should be practiced with caution, otherwise harm rather than benefit may be produced. Persistence of pain usually indicates either improper reduction or nerve injury.

THE PHYSICIAN AND THE AVIATION SERVICE.

It has been appreciated both here and abroad that the aviator is a peculiar type—a "strange bird," as it were. It is therefore especially interesting to follow the development of the regulations concerning the physical examination of aviators and to study the large experience of our allies; this experience has apparently modified the point of view regarding the physical qualities associated with special aptitude for flying. That the great importance of this matter has been recognized in Great Britain is shown by the appointment of a special medical service for the air forces. The character of the men selected for this division of the British military services is a further recognition of the special consideration to be given to the subject. The British Air Medical Service has had placed at its disposal special wards in naval and military hospitals in order to study the physiology and pathology of aviators. All of the medical arrangements of the air forces are to be centralized under its direction. Our man power has not been picked and repicked and selected to such an extent as has that of our allies. Our universities and colleges and athletic organizations contain thousands of men of the type specified as particularly adapted for aviation. In the first sorting of this material the experience of the European nations should be utilized so that in the future we shall not have to retrace our steps to make good unnecessary losses.—*Journal of the American Medical Association*.

BILATERAL CONGENITAL RADIO-ULNAR SYNOSTOSIS.*

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In *Surgery, Gynecology and Obstetrics*,¹ June, 1917, Feidt has a very interesting article on Congenital Radio-Ulnar Synostosis. The condition, as he mentions, is rare, only forty cases having been reported in the literature.

The principal points suggested by Feidt are that there is in both forearms three to six cm. of intimate union of the upper ends of both forearm bones (radius and ulna) and the power of supination is

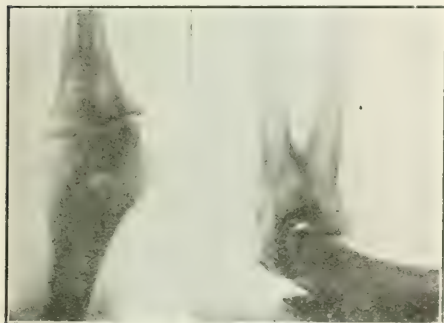


Fig. 1, case 1.—Right side showing the fusion of the radius and ulna at the superior radio-ulna articulation.

largely obtained through the muscles of the arm and shoulder. He notes that nothing is known about the etiology though there may be some hereditary cause. The hands are usually held in pronation and cannot be supinated. Feidt claims that the patient is unable to lift objects of any weight, is continuously dropping objects, and cannot receive small articles or coins in the palm of the hand. The motion at the elbow usually shows limited extension while flexion may be normal. Wilkie² quoted by Thomas³ claims that there the motion is free. The shaft of the radius is enlarged and, in order to preserve the lower wrist joint action, nature causes the radius to be bent outward, making a wider interosseous space than normal. The osseous union of the radius and ulna is firm, as proven by radiographic examinations.

There are two types of the lesion but no sharp line of differentiation between them can be drawn. In one class the radio-ulnar fusion is associated with congenital dislocation of the head of the radius. In this type the head of the radius is more or less

normally developed and the point of fusion is below the head. The other type, considered the primary or true radio-ulnar synostosis, is that in which the upper end of the radius is not fully developed but is fused to the ulna. The fusion in this type includes the head and extends several centimeters down the shaft. There is usually a deficiency of muscular development hence operative procedure



Fig. 2, case 1.—Left side. Anteroposterior and lateral views showing the fusion more marked than the right side.

is of little value. The first type is more frequently unilateral while the second is bilateral.

The two articles above mentioned, cover the subject very well and those interested may consult them with profit. As the condition is rare, each instance discovered should be shown before a medi-

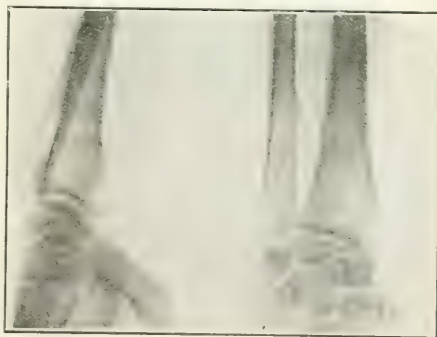


Fig. 3, case 1.—Left hand. Inferior radio-ulna articulation.

cal society and thus be placed on record. I have therefore brought these patients, who came under my observation during the last year, to demonstrate them to you and report them at a later time.

Case 1. P. S., male, age 41, born in Russia, laborer. Though he knew from early childhood that there was some deformity of his forearms still never complained about it as it gave him very little

*Read before Orthopedic Section of the Academy of Medicine, New York, April 19th, 1918.

trouble. He was able to perform all his childhood tasks and when he reached the age to work he also found that he was not behind other laborers of his age.

He did not consult me about this deformity but I happened to have the chance to examine him. He was a patient of Dr. Hale, Chief of Applied Therapeutic Department of Vanderbilt Clinic, who treated him for pulmonary tuberculosis. During an examination when the patient was undressed Dr. Hale noticed that while performing certain motions with the hands the patient rotated his shoulder and brought him to my clinic. The function and power in the deformed limbs are therefore contrary to the conclusion of Feidt.



Fig. 4. Case 2. Right radio-ulna articulation showing the bones of the forearm.

Family History is negative. There is no one in the family with similar deformity.

Physical examination.—Both forearms are kept midway between pronation and supination. He is able to pronate freely but not able to supinate at all. When he attempts to do so he has to rotate the shoulder and the wrist. Flexion of the elbow joints is normal on the left side and limited on the right side which is probably due to dislocation of the head of the radius. X-ray (Figs. 1, 2, 3), shows that there is a distinct osseous union for 5 cm. in the upper ends of both ulnae and radii. The radius is curved outward a great deal producing a wider interosseous space between the bones at the lower end than at normal joints.

Case 2. For permission to show this patient and for the radiograms taken I am indebted to Dr. I. J. Landsman. The patient came to Dr. Landsman's

notice while before the District Board claiming exemption because of this deformity and thus we had a chance to examine him.

A. K., age 34, single, born in Russia. Family History: there were fourteen children in the family, seven died and seven are living (4 males and 3 females) and all had one club finger. Not the same finger was affected in everyone but a club finger was invariably present. The male members had also a peculiarity of having no hair over the cheek bones. As far as the patient knows, no one in either parent's family had a similar deformity of the forearm. Of the fourteen children he alone has

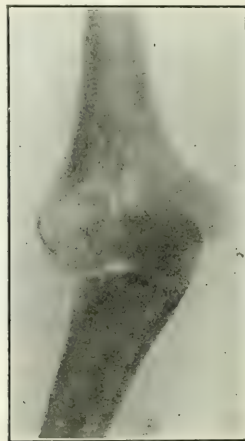


Fig. 5. case 2.—Antero-posterior view of the right forearm.

such an affliction. The deformity was noticed after birth but nothing was done for it. Patient found no inconvenience whatever with his deformed limbs. He can take small coins in his hands and place small objects in desired places. He can lift up and carry a load of 75 pounds. As a matter of fact, in his occupation he constantly carries a heavy satchel with contents weighing about 60-70 pounds. Thus this patient shows himself as did the first patient, to be quite handy with his deficient function.

Physical Examination.—Patient is a robust young man, well developed. Mentally, normal. Stature, normal. No hair over the buccinator but hair in the axilla and over the pubis normal. Genitals, normal. Voice, masculine. The spine and lower extremities are normal. Both humeri are very short. The elbow joints are in position of cubitus valgus, the forearms being at an angle in 160° with the humeri. Both forearms are kept in marked pronation, cannot supinate them at all. If asked

to do that or if he has to perform some function requiring that motion he rotates the wrists and shoulders. The forearms are wider than normal. Flexion is free, extension is free. The left index finger is clubbed.

The radiograms (Figs. 4, 5, 6, 7), show com-

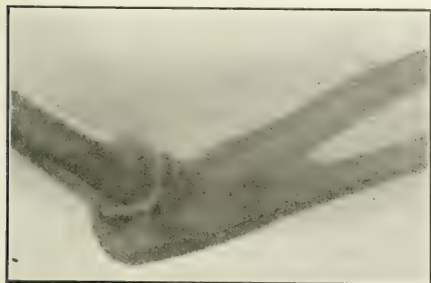


Fig. 6, case 2.—Left hand, lateral view.

plete osseous union between radius and ulna at the upper articulation for a distance of 9 cm. The radii are curved a great deal to allow supination. The heads of the radii are not dislocated.

Comment: Though this patient is the only one in



Fig. 7, case 2.—Antero-posterior view. Left hand.

the family who has the radio-ulna synostosis, in view of the fact of the family tendency to deformity as proven by the club finger and absence of hair over the buccinator we can class this deformity with those due to changes in plasmodial cells.

As the etiology of most of the congenital deformities of the bones are unknown and a great many theories have been advanced requiring proof

or disproof I feel that every fact should be added to the literature. Multiplication of studies may serve to clear up the etiology. I am, therefore, reporting the case without any attempt at filling the etiology.

CONCLUSION.

1. Radio-ulnar synostosis is not so rare as claimed by previous observers. These patients simply do not consult physicians and so pass unnoticed.
2. Patients with such deformity can perform even delicate motions.
3. A hereditary cause can be attributed in some instances as proven by the second patient.

529 COURTLANDT AVENUE.

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HEALTH AND TAXES.

Individual illness places a tax upon the entire community. The prolonged sickness of wage-earners is apt to result in poverty for themselves and their families. Indigency and crime itself are often lurking in the trail of disease.

National efficiency must rest upon the sound foundation of health. The reduction of sickness and death from preventable diseases should be the first step in our preparation for self-defense. Lord Beaconsfield said: "The public health is the foundation on which reposes the happiness of the people and the power of a country. The care of the public health is the first duty of a statesman."

In some States in the Union there has been an increasing percentage of dependents as the States have become more thickly populated. In addition to the enormous losses from death due to preventable diseases when health laws are not enforced, there is a tremendous annual expenditure necessitated by this growing number of those who are unable to bear their part in the world's work.

The insane, the feeble-minded, the consumptive and the pauper place a heavy burden upon the taxpayer.

Provisions and expenditures which aid in the reduction of the things which sap the vitality of the nation will aid in preventing increased taxation for the support of the growing army of the unfit.—*Public Health; Michigan State Board of Health.*

ANASTOMOSIS OF THE VASA DEFERENTIA

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OBSERVATIONS ON THE DIAGNOSIS AND TREATMENT OF GASTRIC AND DUODENAL ULCERS.

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LOUISVILLE, KENTUCKY.

It is thirty years since I devised what has since been known as the "Ludston operation" of anastomosis of the vasa deferentia. It will be recalled that this consisted essentially of coupling the severed vas by means of a single strand of silkworm gut of large size, passed into the lumen of the vas, through its wall and out through the skin at the upper angle of the wound. Until recently, I had supposed that the operation was feasible in all cases in which the vas had been severed, whether recently or not. It seems, however, that anastomosis is not always practicable. In a recent case of double anastomosis, I found no difficulty whatever in the management of the proximal end of the vas. The distal extremity was found to be atrophied and twisted into a corkscrew shape with multiple obliterations of the lumen of the tube. I followed the vas clear down to the epididymis and, finding my usual operation impracticable, did the only feasible thing, viz. anastomosis of the proximal end of the vas to the epididymis. The explanation of the condition in which I found the vasa deferentia in this case, probably is: (1) interference with the nutrition of the distal extremity of the tube by too extensive dissection during resection of the vas. (2) The free separation of the distal extremity of the vas from the supporting tissues which permitted the tube to assume permanently a spiral form on account of its relatively excessive length.

The condition, herein described, may, I believe, be avoided by making a very small incision in the performance of resection and avoiding any more stripping of the vas than is absolutely necessary. It would be better, in my opinion, not to separate the fascial investments from the vas proper.

JEJUNOSTOMY

Jejunostomy is an operation which, fortunately, is rarely required, but, when indicated, it is to be classified among the most important palliative, surgical procedures. The term "jejunostomy" is often applied when, in making an enterostomy to relieve obstruction, the small intestine is opened. "Enterostomy" would be the more correct term, as the opening is made in a distended loop of small intestine, very often regardless of whether it is jejunum or ileum. On the other hand, when enterostomy is made for purposes of nutrition the jejunum is chosen, and the opening is made in its first loop.—C. H. MAYO, M. D., in *The Journal*

In this paper gastric and duodenal ulcers will be discussed together. From clinical, diagnostic and therapeutic viewpoints there would seem no good reasons for separate consideration. Ulcers are the most frequent gastric and duodenal lesions which the surgeon is called upon to treat.

The diagnosis of gastric and duodenal ulcers is by no means always easy of accomplishment, and numerous mistakes have been made based upon a chemical analysis of the stomach contents without careful clinical investigation. Errors are not impossible even after resort to all the available laboratory methods, including roentgenographic and fluoroscopic findings. So great an authority as Mayo admits that upon several occasions he has examined the stomach and duodenum through an abdominal incision without finding evidence of ulcer; continuation of symptoms for several months led to secondary surgical exploration, when ulcer was discovered. He suggests that either ulcer was overlooked at the primary operation, or it was then confined to the gastric or duodenal mucosa, the musculo-peritoneal tissues later becoming implicated. It hardly seems probable that in the Mayo Clinic operative intervention would be undertaken for gastric or duodenal ulcer without every method of examination having been previously used for perfection of the diagnosis; yet he states that at the primary operation no evidence of ulcer was found. This is merely mentioned to emphasize the fact that, despite the numerous mechanical and chemical diagnostic methods, the possibility of error has not yet been eliminated. However, this is probably not due to inaccuracy of laboratory methods, but to human frailty in the interpretation of the findings.

While fortunately mistakes in diagnosis are less frequent now than before the perfection of modern technical measures, the possibility of error still exists. In contemplating the diagnostic difficulties encountered a few decades ago, our admiration for the older clinicians markedly increases. Their accuracy in correlating and interpreting clinical symptomatology, and their diagnostic discernment based upon the clinical findings, must have far exceeded that of present-day practitioners; otherwise diagnostic failure would have been the rule rather than the occasional exception in gastric and duodenal lesions. Chemical analysis of the stomach con-

tents, anamnesis, and the clinical findings, were their only guides to diagnostic accuracy; and it may be said, in passing, that failures in diagnosis then were probably no more frequent than at present.

The foregoing observations suggest that modern laboratory investigations are no more reliable from the standpoint of diagnostic accuracy than clinical methods formerly in vogue, and this is undoubtedly more or less true. I do not wish to underestimate the importance of such diagnostic aids when manipulated by competent workers, but in the hands of the inexpert the findings are misleading and therefore worse than useless as a basis for therapeutic indication. It is admitted that in gastric and duodenal lesions the expert roentgenologist may be able to make an accurate diagnosis in a certain (unknown) percentage of cases, yet the clinical history still remains the most reliable guide.

The treatment of developed gastric or duodenal ulcer is preëminently and distinctly surgical in its significance, although medicinal management in the early stages is still accorded a rather prominent place by the majority of internists. Just what medicinal treatment is supposed to accomplish in developed ulcer seems uncertain. Obviously the benefit derived from gastric lavage with so-called "soothing and healing" medicaments is evanescent in character, and valuable time may be lost by such temporizing. Surgery is indicated so soon as the diagnosis seems assured.

As to the proper method of surgical procedure there has been much debate, and the question has not yet been definitely settled. It is fairly well agreed, however, that gastro-enterostomy is the simplest and safest method of surgical treatment; it affects both the drainage and chemistry of the stomach; diminishing the acidity by the presence of a small quantity of (regurgitated) bile and pancreatic excretion; relieving the pylorospasm, and allowing the stomach to empty itself without irritation of the ulcer by the passage of food. "It thus allows the ulcer to heal, which it does in over ninety per cent. of cases."

Excision of the ulcer should be undertaken in the majority of instances when its location and the physical status of the patient will permit; but even under these circumstances gastro-enterostomy is usually also required to afford drainage. The fact must be remembered that the majority of so-called "pyloric" ulcers are really duodenal, and excision without gastro-enterostomy is usually unsatisfactory in its ultimate results. When the ulcer is located in the terminal two inches of the stomach

excision is probably the most appropriate method; further from the pylorus meso-gastric resection may be required; but even in such cases the less radical procedure of excision and closure would seem preferable in small ulcers.

In considering the treatment of gastric and duodenal ulcers the question of possible sequelæ, such as hour-glass contracture, pyloric obstruction, hemorrhage, perforation, malignancy, etc., must be remembered. It has been conclusively shown that in over fifty per cent. of instances gastric carcinoma is engrafted upon an old ulcer base. The percentage is probably much greater than this, the evidence of pre-existing ulcer having practically disappeared when operation is undertaken for the relief of carcinoma.

Someone has remarked that the most propitious time to effect a cure of carcinoma by operative measures is before the lesion has become malignant; and if the term "precancerous" lesion is ever justifiable, it is in connection with gastric and duodenal ulcers. Early surgical treatment of the ulcer will prevent the development of carcinoma.

The observation is important that in over fifty per cent. of cases of gastric malignancy the disease has progressed beyond the operable stage when the surgeon is consulted. However, even in such cases physical comfort may be increased and life prolonged by gastro-enterostomy or by gastrostomy. Spontaneous disappearance of gastric carcinoma is unknown, and medicinal treatment is absolutely unavailing. In early carcinoma a cure may be reasonably expected from radical surgery in a fair percentage of cases. Early diagnosis and prompt operative intervention offer the greatest prospects of permanent relief.

The following case histories are deemed of sufficient interest to warrant detailed record; they will serve to illustrate and emphasize some of the points already mentioned. Various types of clinical pathology are represented and at the risk of being considered prolix the full records are given in connection with the diagnostic and therapeutic methods employed in each case.

(1) J. S. W., a female, aged fifty-three, married, was first seen December 16th, 1916. Family history negative.

Previous history: patient had the usual diseases of childhood; malaria several years ago; yellow fever in 1878; no injuries. Twenty-one years ago, following birth of her last child, she had perineorrhaphy with curettment and fixation of the uterus performed; some time after that an operation for hemorrhoids and fistula. Several years later a second uterine curettment was performed in New Orleans, La., which she says was of no benefit. A few years later she was operated upon for pro-

lapsed right kidney, which she said relieved her of all symptoms.

Menstrual history: menstruation began at thirteen, and had always been regular. There had been four full-term pregnancies and three miscarriages; the latter came between the third and fourth pregnancies. She stated that before her second child was born she had "paralysis."

Habits: coffee once daily, and tea rarely; she is regular about eating and masticates her food thoroughly. For the last six months she has slept badly and has been very nervous.

Present illness: This commenced six months ago, gradual loss in weight being the first and predominating symptom, which she attributed to worry. This has progressed until the present time, and she has now lost thirty pounds in weight. Prior to six years ago she had sick headache on an average once monthly but has had none since. Her appetite has been poor for the last six months; she cares for nothing excepting a little milk. Taste is normal; thirst is decreased; there is no dysphagia. The only symptom referable to the stomach is some bloating with considerable heaviness and pressure immediately after eating. When she removes her clothing and goes to bed she becomes more comfortable. She has no pain, nausea, nor vomiting. She has been more or less constipated all her life, and takes frequent enemata. She says "her bowel frequently gets packed." At times mucus has been noted in the dejecta. There is no pain on defecation. During the last week there has been some chest pain on deep breathing and also cough due to a cold; slight dyspnea is induced by exertion, and there has been considerable thick expectoration. There are no symptoms referable to the circulatory apparatus. No pain on urination; but the urine has been scant; for three or four years she has found it necessary to void once or twice during each night. There has been no fever nor chills, but weakness has been extreme. As a matter of fact, the chief symptom has seemed to be lack of ambition and a "complete worn out feeling" all the time.

Physical examination: Well developed female, but apparently poorly nourished. Temperature, pulse and respirations normal. The skin has a peculiar cachectic color without eruptions, pigmentations or scaling. The conjunctiva is pale; tongue, gums, teeth, pharynx and thyroid normal. No abnormal findings in the respiratory apparatus. Heart normal as to size and apex beat; there are no murmurs nor thrills. Systolic blood pressure 135, diastolic 95; sphygmographic tracings normal. The abdomen is normal in shape and fullness; no visible nor audible peristalsis. There is slight tenderness in the ileo-cecal region and also to the left and slightly above the umbilicus; no tumors nor muscular rigidity. The stomach is in its normal position; the liver is normal in size; slight tenderness noted over the gall bladder. The intestines are somewhat distended; the spleen is normal in size, and the kidneys are in their normal position.

Nervous system: Memory is not very good, but speech and gait unimpaired. There is slight un-

steadiness while standing with the eyes closed. The pupils react to light and distance. There is complete absence of the patellar reflexes.

Gastric analysis: One hour after Ewald test meal 21 cc. of stomach contents containing considerable mucus removed. Titrations were as follows: free HCl, absent; total acidity, 25; lactic acid, a decided trace; pepsin, none; occult blood strongly positive to benzidine; starch digestion, amidulin. Microscopic analysis showed few fats, moderate number of yeasts, few small epithelia, moderate number of blood cells, many leucocytes and numerous gram positive cocci and rods, the latter often in short chains (Oppler-Boas bacilli).

Urinanalysis: Recent specimen cloudy, amber color, alkaline reaction, specific gravity 1022. There was a trace of albumin, no sugar, a heavy trace of indican, and a faint trace of bile. Microscopically there were many small round epithelia from the bladder and ureter, 20 to 50 pus cells, and 0 to 5 red blood cells to each one-sixth field of the microscope. A few cylindroids were seen, but no casts.

Blood analysis:

Hemoglobin	70% (Dare)
Leucocytes	5,222
Red blood cells.....	3,503,000
Color index.....	One
Differential count:	
Polynuclear neutrophiles.....	63%
Lymphocytes	32%
Large mononuclears and transitorials.....	1%
Eosinophiles	4%

No poikilocytes, few megalocytes, slight anisocytosis, but no polychromatophilia.

Chemistry of blood: The hydrogen ION was 7.6; uric acid 5.5 mg. per 100 cc. of blood (normal 2 to 3); non-protein nitrogen 35.75 (normal under 30); urea nitrogen 18 mg. per 100 cc. (normal under 16); sugar 193 (normal 90 to 120); Wassermann reaction negative.

Radiographic examination: After thorough preparation, plates were made of the gall bladder region, but no shadows were shown. Following this fluoroscopic and radiographic examination was made of the gastro-intestinal tract. The esophagus was normal; the lower part of the stomach (i. e., the pyloric antrum), pylorus, and duodenum filled normally. What was apparently a defect, however, was noted rather high in the greater curvature of the stomach. A plate was made of the stomach with the patient prone which showed a clean-cut large defect in the greater curvature. No residue remained in the stomach after an interval of six hours, and nothing further of importance was noted in the intestinal tract. *Diagnosis: carcinoma of the stomach,—cardiac end, greater curvature.*

Fecal analysis: Macroscopically the form was pasty, yellow in color, containing few food remnants; no pus, blood nor mucus. Chemically the reaction was neutral, bile normal, occult blood positive to benzidine, fermentation normal. Microscopically there were few vegetable cells, a few barium sulphate crystals, moderate number of

meat fibers, occasional leucocytes and epithelia, no red blood cells. Further investigation both fluoroscopically and radiographically corroborated findings of the first examination.

Before undergoing an operation the patient decided to visit Rochester, Minnesota, and I very gladly gave her a letter to Dr. W. J. Mayo, by whom she was operated upon January 6th, 1917. Dr. Mayo wrote me at the time as follows: "I operated on Mrs. W. this morning and was able to resect the stomach by a combination of resection in continuity and the Billroth No. 1 method. The carcinomatous mass was about three inches in diameter and located on the posterior wall close to the greater curvature, extending into the lumen of the stomach as a cauliflower-like mass. There was no glandular metastasis." He adds that the patient was a rather poor subject for operation and presented a number of technical difficulties. Convalescence was uneventful and the patient was discharged from the hospital February 7th, 1917. She remained apparently well for two months—later dying from cardio-renal disease.

(2) J. R., a female, aged sixty-four, unmarried; date of first observation March 21st, 1917. Family history negative for tuberculosis and malignant disease. Grandfather had "stomach trouble." Previous history: patient suffered with anemia when young; later from "female trouble"—probably due to uterine retroversion.

Present illness: Seventeen years ago she began having "indigestion" and gastric pain after the ingestion of food. Attacks of similar character have occurred at intervals since that time. She described the first attack as occurring immediately after eating, and said that she suffered severe pain in the epigastrium and also had "heart-burn." Later the attacks were delayed until one-half hour to two hours after meals. Pain was severe and burning in character. There was no vomiting at any time; she often had "hunger-pains" and food caused temporary relief. The alvine evacuations never contained any blood, and the patient was never jaundiced. Her appetite was good, but she was afraid to eat on account of the discomfort which followed. She has lost considerably in weight, and is constipated. No pulmonary, cardiac or urinary symptoms.

Physical examination: Patient very much emaciated; teeth imperfect; pyorrhea alveolaris. Chest thin; rather harsh breathing at right apex; no rales; voice sounds increased. Heart slightly enlarged, muscular quality somewhat diminished; no murmurs. Lower abdomen distended, visible peristalsis; markedly enlarged abdominal veins. Liver palpable, no masses, tenderness nor rigidity. *Clinical diagnosis: gastric ulcer and operation advised.*

Radiographic examination by Dr. B. W. Bayless. The stomach was of medium size and fixed; peristalsis appeared normal. Evacuation was incomplete six hours after a barium meal. Pylorus nor-

mal in position and slightly mobile; patency free, opening immediate. Duodenum visualized, position normal, slightly mobile, patency free, bulb irregular. Jejunum and ileum showed nothing abnormal; cecum displaced downward. The rest after six hours was in the first compartment, the stomach was fixed at the site of the ulcer on the lesser curvature. *Radiographic diagnosis: ulcer of duodenum.*

Operation March 24th, 1917. Gastro-jejunostomy. Hypodermatic injection $\frac{1}{4}$ th grain morphine with 1/150th grain atropine; anesthetic nitrous oxide gas and oxygen with small quantity of ether. A four inch incision was made along the inner margin of the left rectus; the muscle was then split and the peritoneum opened. Inspection revealed many adhesions about the pylorus. The gall bladder was adherent to the duodenum, and the liver was slightly enlarged. No gall stones present. There was a large indurated ulcer of the duodenum near the pylorus and the entire duodenum was dilated. The stomach was normal in size. The stomach and transverse colon were brought through the wound; an opening was made in the transverse meso-colon, the posterior wall of the stomach being brought through the opening and a clamp applied. The jejunum was then brought upward and anastomosed to the posterior wall of the stomach. The operation was the ordinary (no loop) posterior gastro-jejunostomy. Linen and chromic catgut No. 1 used as serous and through-and-through sutures respectively. The gastro-enterostomy opening was about one inch in length. The transverse meso-colon was united to the stomach just above the anastomosis with five linen sutures. The viscera were replaced and the wound closed in layers with chromic catgut, five silkworm gut sutures being used as stays. *Operative diagnosis: duodenal ulcer perforating.*

The patient was returned to bed after the operation in better condition than when placed on the operating table. The highest post-operative temperature was 100° F. on the third day, the pulse remaining practically normal throughout. The patient was discharged from the hospital the sixteenth day after the operation. Radiographic examination five months later showed the gastro-enterostomy patent, the barium meal passing immediately.

(3) H. G. J., a male, aged fifty-four; first seen March 8th, 1917. Family history negative. Patient denies lues; had "white-swelling" in right hip several years ago which was opened and drained.

Present illness: Two years ago the patient first began having trouble with his stomach, consisting of slight discomfort and belching after meals. The symptoms continued unchanged until six months ago, when discomfort after eating became more

...one in that he had "grinding and grinding" in the stomach. Three months ago he began to vomit and since then has vomited at frequent intervals. However, he has never vomited any blood nor has any been noted in the stools. He complained of severe "grinding" in the epigastrium, but has had no acute pain and his appetite has always been good. During the last three months his strength has become markedly reduced, and he has lost about ten pounds in weight. A month ago he noticed some swelling of his legs, which was more marked on the right side; this swelling has recently partially subsided. No cardiac, pulmonary nor urinary symptoms.

Physical examination: Lungs normal; heart muscle slightly weakened. Patient anemic and emaciated. Movable tender mass in epigastrium; mass nodular and size of English walnut. No jaundice and no other abdominal findings. *Clinical diagnosis: pyloric obstruction, stomach, and operation advised.*

Radiographic examination by Dr. B. W. Bayless: Filling defect at pylorus; stomach slightly dilated; peristalsis normal. Practically complete obstruction at the pylorus. Defect at pylorus is along greater curvature and extends about one and a half inches upward on stomach. Lungs: slight shadows in region of apices. Heart and aorta normal. *Radiographic diagnosis: pyloric obstruction, probably malignant.*

Urinalysis was negative excepting occasional leucocyte and few amorphous phosphates, squamous and round epithelial cells. Phenol-sulphonephthalein functional test of kidney showed twenty-two per cent. excreted in our hour and ten minutes; forty-four per cent. in two hours and ten minutes.

Blood examination: Hemoglobin (Von Fleischl), 58%; erythrocytes, 2,704,000; color index, 1.07; leucocytes, 10,200. Differential count, 160 cells counted; polymorphonuclear neutrophils, 88.13%; lymphocytes, 11.87%; slight amount of poikilocytosis and anisocytosis. Wassermann-Noguchi reaction negative.

Operation March 30th, 1917. Partial gastrectomy. Hypodermatic injection $\frac{1}{4}$ th grain morphine with $\frac{1}{150}$ th grain atropine. Anesthesia nitrous oxide gas and oxygen. A four inch incision was made along inner border of the left rectus; the muscle was then split and the peritoneum opened. Lower half of the stomach found infiltrated by carcinoma; there were no glandular enlargements, and only the stomach seemed involved. The stomach was delivered through the incision; gastro-hepatic and gastro-colic omentum clamped and ligated. Payr clamps applied to duodenum and stomach at Mikukicz-Hartman line and intervening portion excised. Stump of duodenum cauterized and inverted with Cushing suture reinforced by Lembert. The upper part of gastric end closed in like manner, and lower part left open and anastomosed into jejunum near its origin, the jejunum having been brought

upward through the posterior transverse mesocolon. This opening was united to the stomach above the line of anastomosis. The omentum, which had been opened to bring the jejunum though the transverse meso-colon, was then closed. The omentum was adherent to the pelvis. Hemorrhage was very slight, and there was no vomiting nor cyanosis during the operation. The wound was closed in layers with chromic catgut and stay sutures of silkworm gut applied. The patient was returned to bed in good condition.

The tissue removed was submitted for microscopic examination to Dr. Stuart Graves, Pathological Department, University of Louisville, whose report follows: Gross description: specimen consists of 9 cm. of pyloric end of stomach and pylorus. Serosa is pinkish red, smooth and streaked with blood vessels. Attached to curvature are small masses of flabby, fatty tissue. No lymphatic glands found in this fat. On palpation walls are markedly thickened and indurated. When specimen is cut along lesser curvature, mucosa presents an irregular, nodular to granular area 8 x 6 cm., longer measurement corresponding to long diameter of stomach. In central portion of area is a nodular projection 2 cm. in diameter and 2 cm. in height. Surrounding this projection is a granular area. On either side are deep pit depressions about 2 x 2 cm. Color varies from a bright, fiery red to grayish yellow. Stringy mucus is noticeable. On section walls are firm, grayish streaked with grayish-white, interlacing lines, and 2 cm. in thickness. Microscopical diagnosis: colloid carcinoma.

Post-operative history. The patient's convalescence was uneventful. The highest temperature recorded was 101° F. on the twelfth day, the pulse at that time reaching 120. Both gradually receded to normal and there was no further rise. For a week the diet consisted of broths, milk, soft-boiled eggs, etc., then semi-solid food was allowed. The patient was discharged from the hospital on April 18th, 1917, apparently well.

On November 17th, 1917, this man returned to Louisville with a rather extensive obliterating phlebitis of the right leg; there was considerable swelling below the knee and an ulcer on posterior aspect of the calf. These lesions subsided promptly under appropriate treatment. Radiographic examination at that time showed the stomach functioning normally; the patient had gained in weight and was able to eat anything he desired. A letter from him dated April 8th, 1918, reads: "I am doing fine and have no unpleasant or disagreeable feelings as a result of the operation."

(4) R. S., a female, aged forty-eight, married, mother of six children; first observed the latter part of June, 1917. Family history negative. Previous history: health always good as a girl with exception of childhood infections. She has complained more or less of "indigestion" since twenty-one years old, the attacks recurring periodically. She has had no injuries, and no operations. Menstruation regular.

Present illness: Present attack of so-called indigestion began in August, 1916, pain and vomiting being the first symptoms noted. The condition has been progressive, and she has lost nearly forty pounds in weight during the last year. There has been slight headache at times; appetite poor; taste and thirst normal. Abnormal sensations in abdomen consist of bloating, fullness, sourness, "burning and gnawing" in the stomach. These symptoms have been more or less constant and accompanied by nausea since March, 1917. She has vomited quite frequently, especially when the stomach was filled with food. The vomitus was large in quantity, consisting of food ingested since the last vomiting period and was always sour. No blood was ever noticed. Pain and distress was relieved by vomiting. Constipation has been more or less persistent throughout. There have been no symptoms referable to the respiratory, circulatory nor genitourinary tracts.

Physical examination: Patient is poorly nourished; skin pale; tongue fairly clean; teeth in bad condition. No findings referable to the lungs. No murmurs detected over precordium, but there was decided arrhythmia. Blood pressure systolic 100. Abdomen flabby, tender in right upper quadrant, and apparently much thickening in that region; no rigidity. Stomach greatly dilated, the lower border reaching below the umbilicus; liver normal in size; slight intestinal "gurgling"; kidneys not palpable. *Clinical diagnosis: pyloric obstruction, probably from ulcer.*

Gastric analysis: One hour after Ewald test meal, 790 cc. stomach contents removed, which consisted of the residue of food products eaten the previous forty-eight hours. Titrations were as follows: free HCl, 54; total acidity, 74; free acid and acid salts, 60; combined HCl, 14; organic acid and acid salts, 6; lactic acid, trace; pepsin digestion, normal; starch digestion, erythro-dextrin; occult blood strongly positive to benzidine. Microscopically many yeasts, sarcinae ventriculi, vegetable cells, etc., were seen. There were a moderate number of blood cells also, but no leucocytes.

Radiographic examination: After the ingestion of a barium lactone mixture the gastro-intestinal tract was studied with the following results: Stomach hypotonic, displaced downward, very large, mobile, very little peristalsis, and practically the entire quantity remaining after six hours. The pylorus was in its normal position, slightly mobile, almost completely obstructed, the opening not seen. The duodenum was not visualized. *Radiographic diagnosis: ulcer of the pylorus, with nearly complete obstruction.*

Operation July 2d, 1917. Gastro-enterostomy; cholecystectomy. Hypodermatic injection 1/6th grain morphine with 1/150th grain atropine. Anesthesia nitrous oxide gas and oxygen with small quantity of ether. Median incision disclosed a much dilated stomach which immediately bulged into the wound. The gall bladder was much enlarged, contained many small calculi and was densely adherent to the first portion of the duodenum. Separating these adhesions an opening large enough to admit the finger was exposed on upper anterior duodenal surface about one inch from the pylorus. The area about this was much thickened and infiltrated. This duodenal opening was closed by four deep interrupted chromic catgut sutures. A classical posterior gastro-enterostomy was then performed, using chromic catgut for hemostatic sutures and linen for serous. Cholecystectomy was then performed, the cystic duct and artery being ligated with No. 1 twenty-day chromic catgut. At the lower outer portion of the fundus the peritoneum was edematous and tremendously thickened. There was no opening in the gall bladder where it was attached to the duodenum. Numerous small black calculi were found present. The wound was closed with chromic catgut en tier and silkworm gut stay sutures applied. One cigarette drain was inserted to the stump of the gall bladder. Convalescence was uneventful, the patient being discharged from the hospital twenty-six days after the operation.

(5) Miss C. S., aged thirty-seven; date of first observation September 6th, 1917. Family history: father died from tabes dorsalis; mother died from nephritis. One sister and three brothers living and well; one sister died from cerebral hemorrhage, one brother from "abscess of the bowels," four weeks' duration. History negative for tuberculosis and carcinoma.

Previous history: The patient stated that ten years ago her physician told her she had "cardiac trouble." She had suffered the usual diseases of childhood, also typhoid fever. She claimed that she had never been very well. Menses began at sixteen, regular of the twenty-eight day type, duration five to six days, painful first. Sometimes there was a vaginal discharge between periods, but no blood nor clots. She gave a history of numerous attacks of sore throat.

Present illness: Three years ago the patient began to vomit after meals. Pain in the stomach principally before meals, and was sometimes relieved by the ingestion of food. Blood had occasionally been noted in the feces. Pain and vomiting occurred at irregular intervals; much belching of gas during an attack; food undigested and fermented when vomited. Patient has lost fifteen pounds in weight during last few months. No cough nor pain in chest; no night sweats; no jaundice.

Fecal evacuations normal and regular prior to beginning of last attack, then some diarrhea. No urinary symptoms. Last attack began eight weeks ago and has persisted until the present time.

Physical examination: Patient pale and emaciated; tonsils enlarged; teeth false above, fairly good below. Neck negative for thyroid enlargement and pulsations; lungs negative; heart negative excepting abnormal second mitral sound. Abdominal mass distinctly palpable to left of midline between the umbilicus and costal border. *Clinical diagnosis: gastric carcinoma, and exploratory operation advised.*

Urinalysis showed the urine acid in reaction, specific gravity 1019. There was present a large amount of indican, a few epithelial cells, but no casts. Blood examination not made.

Operation September 6th, 1917. Exploratory. Hypodermatic injection 1/6th grain morphine with 1/150th grain atropine. Anesthetic nitrous oxide gas and oxygen with small quantity of ether. Left median incision; stomach found entirely to left of midline, the pylorus being at region of mass palpated externally. The entire pyloric region was involved in a fist-sized mass and somewhat fixed, though susceptible of delivery from the abdomen. The mass extended toward the cardia about five inches, involving anterior, lower and posterior stomach walls. The gastro-colic omentum was filled with enlarged lymph glands and contracted, drawing colon close to stomach. Many enlarged glands in gastro-hepatic omentum, some even at hilus of liver, and others felt in deep mesenteric group. The greater omentum contained several small nodules, one of which was removed for microscopic examination. Gall bladder, cecum, and spleen, normal. No nodules felt in liver. The wound was closed en tier with chromic catgut, and six stay sutures of silkworm gut applied. *Operative diagnosis: inoperable carcinoma of the stomach.*

The small nodule removed was submitted for microscopic examination to Dr. Stuart Graves, Pathological Department, University of Louisville, whose report follows: Gross description: specimen consists of firm, pale gray nodule 15 x 12 x 9 cm., surrounded with fat. On section cut surface is pale gray, enclosing small areas of bright yellow tissue. Microscopical diagnosis: metastatic carcinoma, acute and chronic inflammation.

The patient did well after the operation and was discharged from the hospital in good condition the sixteenth day, the wound having united per primam. There has been no vomiting since the operation. Of course, nothing need be said concerning the prognosis.

HOLD YOUR LIBERTY BONDS.

One who subscribes for a Liberty Bond and gets credit as a patriot for doing so is not acting patriotically if he immediately sells that bond—that is, unless he imperatively needs the money, says Secretary McAdoo. It is not the mere subscription that helps the Government, it is the actual loan; shifting the bond to someone else does not help.

The same objection lies to exchanging Liberty Loan Bonds in trade. Merchants offering to take Liberty Loan Bonds in exchange for merchandise are doubtlessly actuated by patriotic motives, but such transactions tend to defeat a primary object of the bond sale, the encouraging of thrift and the discouraging of expenditures. Bonds so exchanged are in most cases immediately sold on the open market, which tends to depress the market price and affects adversely the sales of future issues.

Secretary McAdoo expressly states that there is no desire on the part of the Government to prevent or interfere with legitimate trading, in good faith, in Liberty Bonds.

It is one of the great objects of the Treasury Department to have these bonds held as permanent investments by the people and paid for out of savings, thus at once providing funds for the Government and conserving labor and material.

There are the soundest reasons for holding Liberty Bonds. Their quotations under par on the stock exchange means a loss only to those who sell. The financial history of the United States shows that in times of peace all of its bonds have gone above par, some as high as 139. The tremendous growth of our resources and of our trade, our domestic trade alone having increased from \$30,000,000,000 to \$64,000,000,000 in the last four years, warrants the belief that our Government bonds are the soundest investment in the world, and with the restoration of peace conditions will command a handsome premium in the market.—*Treasury Department; Bureau of Publicity.*

AN ARMY OF CIVILIANS.

There is no wall between the army and the civilian population. Now this is just as true of pneumonia, meningitis, and scarlet fever, as it is of the venereal disease; there is no wall between the two. The difference existing between the military population of this country today and the civilian is one of fluidity, and not of solidarity; and what we need is a centralized health department in some way or another. We should not think of anything less than that.—V. C. VAUGHN, M.D., in *The Medical Fortnightly*.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

SUBSCRIPTION PRICE, ONE DOLLAR.

FOREIGN, SIX SHILLINGS.

Original Articles and Clinical Reports are solicited for publication with the understanding that they are contributed exclusively for this Journal.

It is of advantage to submit typewritten manuscript; it avoids errors.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, SEPTEMBER, 1918.

A SURGICAL LOAN.

The Fourth Liberty Loan Campaign is about to be launched. Its success is beyond doubt. The impetus of recent victories on the Western Front has stimulated untold enthusiasm. The lengthened casualty lists have awakened all sections of the country to the blood-price of warring for an ideal for humanity.

The Nation is engaged in a stupendous operation. The unwilling patient has struggled against the anesthetic, and in consequence, has to be held down by numerous attendants. The scalpel is penetrating his flesh with a mission of mercy that does not aim at his destruction, but at his rescue from a malignant growth which has threatened his vitality, and whose foul emanations have poisoned the free air of the world. The prognosis is excellent. Unfortunately, some of the workers in the great amphitheatre are suffering from heat, fumes, and accidental injuries and infections arising from the extensive character of the operation, and the difficulties due to the struggles of the patient.

Surgeons are conscious of the necessity of ample funds for successful work in the ordinary hospital. Moneys are needed for instruments, for dressings, appliances, apparatus, laboratory facilities, and countless special instruments and therapeutic agencies. The operation on Germany is slow and prolonged, and must not be hampered by a lack of those essentials requisite for success.

The entire medical profession is participating in this new operation for the restoration of normal consciousness and action to the badly diseased and maniacal patient. More than 20,000 American doctors have left civil life to participate in this world adventure. Numerous valiant servants of the Nations of the world have solved the mystery of life and ungrudgingly have given their all by crossing the threshold to death following Mars.

Physicians not employed in government service directly connected with the war are uncomplainingly assuming numerous duties taxing their time, energies, and thought. All are giving of themselves, and responding to the common call of conscience, self-respect, and loyal devotion. Practicing medicine under the guidance and protection of a free country creates obligations and duties above those belonging to ordinary citizenship. The higher the intellectual development of a class, the keener should be their reactions, and the more sensitive their response to the cries of distress for assistance and relief.

National warfare embraces all classes of the community. In proportion to one's means, money may be loaned to one's government, but this constitutes no real giving of self. Those of us who are not in uniform are under the most vigorous pressure to rally to the support of our colleagues that they may have every facility to perform their services in accordance with the high traditions of the profession. If the cost of the Medical Department of the United States were estimated in terms of dollars and cents, what a tribute it would be to professional enthusiasm to be able to write and state that the full cost was met by loans from the profession to the government through the purchase of Liberty Bonds!

This is no time to think in terms of the investment value of bonds, nor to dilate upon the soundness of such investments. The motive which should dominate the profession in the purchase of the new issue of bonds should not be that of crass self-interest in the accumulation of negotiable assets, or the building up of a financial reserve guaranteed by the resources of the United States. One motive only should impel the medical profession to respond freely, willingly, and liberally, and that is a sense of a desire to play a part—the biggest part possible—in promoting the efficiency of our American Forces and in advancing the strength, the power, the forcefulness of the government in which every man is a participant.

The surgical fraternity is conscious of the meaning of struggle, suffering, anxieties, horrors, and the gruesomeness of warfare on an individual scale.

It is no less alive to the magnitude of the surgical operation now being performed on the once peaceful fields of Europe. The tangible expression of feeling, the response of the heart to humanity's shriek for redemption, will be found in the outpourings of money for the support of the war. Every man must ask of himself, how much would I give to bring about peace; to restore order; to rehabilitate suffering lands? The thousands that you would give for peace are called for now to promote the war which alone can bring peace. The Fourth Liberty Loan is but another peace offering of the American people.

Buy Liberty Bonds!—I. S. W.

THE REPORT OF THE EMPYEMA COMMISSION AT CAMP LEE.

In the early part of this year, the medical authorities in Washington were appalled at the immense mortality of empyema at the various camps, the mortality averaging about 30% and in some camps reaching 85%. The Surgeon General thereupon organized a Commission, consisting of surgeons, internists and bacteriologists to investigate and report upon this formidable malady. The report of this Commission, whose studies were instituted at Camp Lee, is now at hand (Journal Medical Association, Aug. 3rd and 10th, 1918), and forms one of the most interesting medical contributions resulting from the present war.

These empyemata differ from most of those observed in civil practice by the fact that they are due to infection by the streptococcus hemolyticus; that they follow or are coincident with peculiar forms of organizing broncho-pneumonia and that they are frequently associated with measles. Such an epidemic was extremely prevalent in our camps this winter. The symptomatology, pathology and bacteriology of this disease have already been reported by Cole and MacColum, Irons and others. (See Review of War Medicine and Surgery published by the Surgeon General, June, 1918.)

The Commission's report is based upon the study of 140 cases; of this number the larger majority had been operated before the Commission arrived, so that the Commission had the opportunity to make complete observations in only 23 cases. Of the latter only one died (4.3%), which unquestionably shows that the Commission "made good." While they modestly say that this low mortality may have been due to a diminished virulence of the organism; nevertheless they still believe that the greatest factor in lowering the mortality has been a better method of treatment. Briefly, the two most important rec-

ommendations of the Commission are these: 1. delayed operation. 2. maintenance of the nutrition.

1. Delayed operation. Certain observations lead the Commission to the advisability of advocating a late operation. (a) In streptococcus empyema the fluid at first is sero-fibrinous and only after two to three weeks does the fluid become purulent. (b) Early operation involves the danger of lung collapse from pneumothorax. As cyanosis and dyspnea are two of the prominent symptoms, owing to the diminution in pulmonary breathing space from the extensive bilateral pneumonia, the danger of further limiting the available breathing space is obvious (c) The danger of producing a blood sepsis from absorption through the wound. This occurred in two cases. (d) These patients in the early stages are in too desperate a condition, to withstand operation. On theoretical grounds the elimination of immense quantities of toxin and relief of mechanical embarrassment by early operation might seem a rational procedure. On the other hand, the Commission found that the patients are in no wise profoundly poisoned by the pleural infection; indeed they have seen patients who carried more than 500 c. c. of pus for several months, who were by no means in a critical condition. These observations lead them to believe that pleuritic involvement is of much less importance than the pneumonia in causing the high mortality. On the other hand, they have found that the mechanical embarrassment can be easily relieved by repeated aspirations. Indeed, the usual procedure has been to aspirate the patient at once, drawing off a liter or more, if the effusion is large. This is repeated, usually at intervals of two to six days. Usually by the fourth aspiration, the fluid has become frankly purulent and the pleural cavity is then drained. By that time, the pneumonia has improved as well as the general condition. In three cases, operation was found unnecessary because the fluid failed to reappear after aspirations.

The method of operation is described in detail. Local anesthesia was used in all primary operations. The site of the incision depending upon the Roentgen Examination, should be chosen so as to afford good drainage in both erect and recumbent posture, and should be of ample length, usually two to four inches. The Commission insists upon the necessity of good and continuous drainage throughout the convalescence. This consists in inserting either a double barrelled rubber tube of large calibre, or an arrangement of tubing and bottles designed to drain the cavity with the aid of suction. Both methods are readily applicable to the employment of Dakin's solution to irrigate the pleural

cavity, a procedure which they regard as a *sine qua non* in the handling of these cases. Their method of using Dakin's solution requires the most painstaking attention to detail; for a description of this method, the reader is referred to the original paper. At all events, the Dakin's solution is employed until the discharge is sterile, when the wound is permitted to close spontaneously or by a plastic operation. Indeed the remarkable speed with which cavities close after the prolonged use of Dakin's solution, even in cases where expansion of the lung has been delayed, lead the Commission to believe that extensive secondary operations to obliterate cavities will be found after subsequent observations to be unwarranted, except in very rare instances. Auxiliary measures to help expand the lungs are useful, such as blowing against resistance, suction devices, etc.

2. Maintenance of Nutrition. The rapid wasting of their patients, led the Commission to study the nitrogen output in the early stages of empyema associated with the hemolytic streptococcus. Accompanying charts show strikingly an increase in nitrogen excretion and the restoration of balance by a high caloric diet (3000-3500 calories). The Commission regards this observation as one of the most important and interesting of their investigations, and feel that the care given to the nutrition of their patients has been one of the most important factors in lowering the mortality.

Space does not permit us to enumerate the host of other highly interesting and suggestive findings scattered throughout this report. This review is merely a bare outline, but we trust it has been sufficient to stimulate everyone who has the medical welfare of our soldiers to heart, to read the original report.—E. M.

A FIVE MILLION ARMY MEANS FIFTY THOUSAND MEDICAL OFFICERS.

With an army of three million men in the field or in training, and, as contemplated, an expansion of this force to five million men, the Surgeon-General must have in the Medical Reserve Corps at least fifty thousand doctors.

The Medical Corps must keep a pace in growth with the army expansion and it behooves every doctor in the United States between the age of 21 and 55, who is physically, morally and professionally fitted, to arrange at the earliest possible moment, his personal affairs so as to offer his services to his country in the capacity of a medical officer.

The United States is in the war to do her part in winning the struggle and this can only be accomplished by a large and well-trained body of troops

adequately cared for by a sufficient number of medical officers. The importance of the doctor's service and its relation to the successful outcome of the war cannot be underestimated.

As the mobile forces increase in size, so is there an expansion of Base Hospitals and other Institutions for the care of the sick and wounded and there should be no lack of officers when required to give to our patriotic boys, that professional attention which is so essential.

It is well for the medical profession of the United States to realize at once that a Medical Reserve Corps of at least 50,000 doctors will be required to meet the demands of the Surgeon-General and upon which Corps he can draw for his medical officers.

We believe by this time that the profession of this country must be fully alive to the needs of the service, so let every doctor who is qualified, feel that he is doing not only his patriotic duty in offering his services as a medical officer but is relieving the tension of the Surgeon-General's Office by placing at the command of the Chief Officer of the Medical Department an adequate force without frequent beating of drums to supply the necessary number with each increase of the mobile forces.

If you have not already received an application blank for commission in the Medical Reserve Corps, your nearest Examining Board or the Editor of this journal will be glad to supply you.

THE ANTISEPTIC TREATMENT OF WOUNDS IN CIVIL PRACTISE.

It is not possible for surgery to pass through the hitherto unparalleled experiences of this war without having left upon itself an indelible impression. Probably no other phase will be so profoundly affected as that of the control of infection. Naturally one thinks immediately of the new principles involved in the Carrel-Dakin technic. One begins to wonder how civil practise will be affected.

A beginning is seen in the communication of Hartwell.* Cases were treated according to the orthodox method at Bellevue Hospital. Similarly to the military wounds these could be classified as those within the first six to ten hours—contaminated cases; cases after this interval designated as infected cases; cases after twenty-four hours—in the stage of established suppuration.

In summarizing the opinion is expressed that the experience has demonstrated the practicability and advantage of the Carrel-Dakin method in civil hospitals. "In those civil hospitals where a traumatic service is not an important part of the hospital work, it is doubtful whether the inauguration of this treatment will meet with great success, for the reason that the call for its use will not be frequent enough to make it an established routine. Without this, it probably would be no more effectively applied than is any other special form of treatment which is only occasionally demanded in a general hospital service, and if ineffectively applied it cannot be expected that satisfactory results will follow."—A. O. W.

*Annals of Surgery, April, 1918.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

HOSPITAL STANDARDIZATION.

Because of conditions threatening the effectiveness of civil hospitals, numerous plans are being proposed to safeguard medical and nursing staffs and to curtail expenses and protect the general investments. It is natural that the general movement for standardization of hospitals and dispensaries which was beginning to gain force previous to America's participation in the war should be urged as a program of necessity.

Hospital standardization presents many phases, depending upon the interpretation of individuals as to what constitutes reasonable standards worthy of general application. It must be patent that hospital organization includes three types of development which largely overlap one another and, in consequence, are greatly interdependent. The financial aspects are of the utmost importance, but no more so than the problems of internal house-keeping, and far less so than the maintenance of an adequate system of care of the sick.

In contemplating any program of standardization, the objects and purpose of hospital existence must be borne in mind. It is primarily an institution for the care of the sick and, principally, those of limited financial means or actually below the line of financial independence. From the standpoint of communal benefits, the private pavilions possess a subordinate position, though, nevertheless, the needs of the private patient department of hospitals cannot be overlooked in view of their aid to hospital resources.

In order to protect the capital invested and maintenance charges and to facilitate the reduction of unnecessary expenditures for essential service much remains to be perfected to assure a reasonable standard of physical plant that is not extravagant in its ornateness nor lacking in the requisite structural principles necessary for proper sanitation and professional achievements. Standards of hospital efficiency must necessarily depend to no small extent upon the layout of the hospital with all its departments and subdivisions.

Similarly, the standardization of departments designed to meet the needs of in-patients and out-patients depends upon the plan and scope of the hospital. In consequence, marked difficulties arise in enunciating definite standards, although it is possible to establish certain principles representing

minimum standards that may be applicable to almost every type of institution.

From the point of view of caring for the sick, the standardization of equipment within the limits of the general plan of the institution is almost imperative. Full laboratory facilities, for example, is a requisite for the routine investigation of patients, without which, a low standard of medical and surgical service is almost certain. The standardization of dietaries, laundry facilities, does not present great difficulties when sufficient funds and available and capable intelligent individuals are in charge of these departments. Nevertheless, the development of a standardized equipment and the elucidation of institutional methods and processes would be of considerable value.

La Roque in an interesting pamphlet on the Professional Duties and Government for the Care of the Sick in Hospitals has pointed out the importance of standardizing professional duties, rules and regulations for the purpose of facilitating the standardization of professional work in hospitals. His analysis considers pupil nurses, special nurses, night nurses, head nurses, and other higher officers of the nursing staff, the dietitians, pharmacists, surgical technicians, the internes, anesthetists, registrars, pathologists, roentgenologists, ambulance surgeons, visiting professional staff, medical director and all the other high and low officers essential to securing a high standard of professional work. He outlines and differentiates the responsibility and authority for each of the individual components in the vast staff of hospital co-workers. His efforts represent the application of common sense and judgment based upon experience in the enumeration of specific functions. He seeks to obviate differences of opinions and aims to make certain that there is no overlapping of function or danger of neglect from indefiniteness or uncertainty as to whom a particular duty belongs. There may be differences of opinions regarding the distribution of duties as proposed by La Roque, but there can be no doubt that his scheme is a move in the right direction.

Standardization, however, comprises more than the definition of duties of staffs or the supplying of an up-to-date physical plant. The fundamental element in any scheme of standardization must consist in standardizing the purpose of a hospital. The principles involved in giving adequate care to the sick must include all that is necessary to provide modern, scientific, and humane treatment, not merely along traditional medical and surgical lines, not excepting, of course, special branches, but also in accordance with the principle of the rehabilita-

tion of the sick to a point of renewed potential usefulness to society. Re-education, follow-up systems, social service, are not widely introduced, nor has their need been duly appreciated and, in consequence, hospital organizations have scarcely begun to standardize this most modern phase of their effective work.

The responsibilities of hospitals have taken on a wider significance. The care of the sick is not simply a function in the interests of individual patients, but is part of a larger plan of social benefit. The hospital is an important factor in the protection and betterment of society. From the time of contact with the sick until their release from supervision, the primal object should be the public interest secured through the relief of the individual from the handicaps of and impairments to normal functioning.

It is difficult to standardize the methods by which such a broad visioned goal can be attained. It is within the bounds of possibility, however, to effect a rational system of standardized case records that will enable the community to reap some benefit from the clerical work involved while affording sufficient data for the immediate needs of the business side of the hospital or for the professional branch of hospital organization. It is possible to standardize cost accounting systems in definite directions, to standardize some of the numerous dietaries, to standardize special equipments and to differentiate duties in such a manner as to raise existent standards of hospital organization. The real purpose of standardization is to promote service, efficiency, and economy with increased benefits to the patients in the hospital and to the community which the hospital aims to serve. It is not possible at any present time to standardize research work, teaching, laboratory technic, social service, or any other developing branch of hospital service. It is possible, however, to lay down standard principles to be followed, studied, and controlled with a view to modification and readjustment in the light of experience.

It is of immense importance to possess ideals even though they never may be attained. Formulating a plan that embraces an ideal hospital system should be the first step in any plan of standardization, in another sense, is to make possible for all types of institutions a minimal technic and method whereby an ideal rational organization may be achieved without loss of time, money, energy, service, or humanity.

Certainly, all steps taken in this direction merit encouragement, study, and discussion with the utmost freedom in the interest of the common good.

Book Reviews

The Diagnosis and Treatment of Venereal Diseases in General Practice. L. W. HARRISON, D.S.O., Lieutenant-Colonel, R. A. M. C.; Lecturer on Venereal Diseases and Officer in Charge, Military Hospital, Rochester Row, London. HENRY FROWDE, HODDER & STOUGHTON, OXFORD UNIVERSITY PRESS, Warwick Square, E. C., 1918. Price \$7.50.

Combating venereal diseases is sufficient reason for an expanding literature. The author believes that diagnosis and treatment by the general practitioner must necessarily be the backbone in eliminating their spread. The field of this book, which makes no claim to original work, is, therefore, the one in which he believes every member of the medical profession should be working. The purpose is designedly to assist medical men to realize their responsibilities and to fit themselves for diagnostic and therapeutic work in this direction.

The subject matter is unfortunately not well arranged. To find gonorrhea listed as a lesion of the penis may be rather disturbing, but no more so than to find Hutchinson's teeth pictured in the general discussion of venereal diseases of the mouth and throat, and barely referred to in the discussion of congenital syphilis. There are advantages and disadvantages in making the treatment of gonorrhea and syphilis entirely separate from the chapters devoted to diagnosis. The two chapters dealing with laboratory examinations and interpretations of reports are satisfactory.

Considering that the author has purposely eliminated all references to the urethroscope and cystoscope because their value in the hands of general practitioners is negligible, the various lesions for which such instruments of precision would be used are carefully and well described. The differential diagnoses are well worked out and the methods of treatment are briefly described without the presentation of methods that have not received thorough trial in varying conditions. The illustrations are well selected and reproduced and contribute to the usefulness and value of this handy and on the whole satisfactory volume.

The Prevention of Venereal Diseases. OTTO MAY, M.A., M.D. (Cantab.), M. R. C. P. (London), late Hon. Secretary, National Council for Combating Venereal Diseases. London, HENRY FROWDE, HODDER & STOUGHTON, OXFORD UNIVERSITY PRESS, Warwick Square, E. C., 1918. Price \$3.00.

Regarding prophylaxis as the most essential factor in the control of venereal diseases, the author does not hesitate to attack problems of education, personal prevention and prostitution with directness and forcefulness. Believing strongly in the necessity of education for the purpose of developing self-control, the author is not carried away by his enthusiasm for this or for the teaching of the relation of biology and disease. He recognizes the limitations of hospitals in the matter of treating venereal diseases and in consequence is not wholly enthusiastic concerning the Local Government Board Treatment Scheme which makes available early treatment centers. As a practical matter, he finds regulation of prostitution to be a failure and impracticable as the medical examination and treatment schemes are unsatisfactory.

The purpose of the volume is well presented in the discussion of personal prevention, which he regards as of particular importance on the basis that from a preventive standpoint the problem of venereal diseases "is not a question of safeguarding individual misconduct; it is a vital factor in the struggle to improve the health and well-being of the nation."

An elaborate appendix is made more valuable by the presentation of a lecture to troops that has been used in discussing venereal diseases. The book, as a whole, is timely, and while not an elaborate discussion of the subject, it presents in a sane and orderly fashion the point of view of the author on venereal prophylaxis without side-stepping or evasions because of fear of criticism or clerical hostility.

Reclaiming the Maimed. A Handbook of Physical Therapy. By M. C. CAPTAIN R. J. MANION, M.D., Major R. A. M. C. OF THE CANADIAN ARMY MEDICAL CORPS. D. APPLETON & COMPANY, New York, London, 1918. Price \$1.50 net.

The growing attention being given to the disabled demands new volumes devoted to treatment. McKenzie's brief little book with its wealth of illustration, in which one recognizes the artistic touches of Dr. McKenzie, is a distinct contribution in that it is based upon practical experience in dealing with the types of maimed the war produces. Obviously, standardization of physical therapy is of importance in the organization of orthopedic institutions for the reclamation of the handicapped. Electricity, radiant light and heat, hydrotherapy, massage, re-education by means of apparatus, gymnastics and athletic games, occupational procedures will play an important part in re-creating usefulness, self-dependence and power among the maimed. Methods by which these physical agencies may be utilized are briefly described and discussed. There is a wealth of material in a very few pages which should be read by all who may be of service in the important work of reclaiming the maimed.

A Surgeon in Arms. CAPTAIN R. J. MANION, M. C. of the Canadian Army Medical Corps. D. APPLETON & COMPANY, New York, London, 1918. Price \$1.50 net.

The personal and intimate side of warfare appeals to those whose emotional experiences are necessarily limited to reading the literary history of the war. The experiences of the medical corps are recounted in technical language in current medical journals. Captain Manion gives the reader an opportunity to visualize the experiences in numerous forms of military life. There is a warm, sympathetic treatment of the duties performed in the trenches, hospitals, and casualty clearing stations. The tragedy and comedy of war, the laugh and the cry are humanized and vitalized by a soul that has seen and felt and has used a facile pen to transcribe life as it is, where men play the game of war with the best of comradeship, without fear and for the service of a land they call their own.

A Text-Book of Bacteriology. A Practical Treatise for Students and Practitioners of Medicine. PHILIP HANSON HESS, JR., M.D., Late Professor of Bacteriology, College of Physicians and Surgeons, Columbia University, New York City, and HANS ZINSSER, M.D., Professor of Bacteriology, College of Physicians and Surgeons, Columbia University, New York City; Bacteriologist to the Presbyterian Hospital; formerly Professor of Bacteriology and Immunity, Stanford University, California. 769 pages, with 155 illustrations. Third Edition. D. APPLETON & COMPANY, 1917.

This third edition offered Zinsser an opportunity to bring this compact text-book up-to-date. The book has been completely "overhauled" and the most recent work added, viz.: Petroff's medium for cultivating tubercle bacilli, Krumwiede and Eudo's media, the latest work on pneumococci and treponema pallidum.

The portions of this book devoted to the pathogenic bacteria and to immunity are written with much ability. The facts are presented clearly, extremely well grouped and the illustrations teach as well as illustrate. Much practical experience has served to enable the author to revise this small volume and yet keep within its covers a most comprehensive review of bacteriology.

The Treatment of Cavemous and Plexiform Angiomas by the Injection of Boiling Water. By FRANCIS J. WYETH, M.D., Consulting Surgeon to St. John's Hospital and Missouri Baptist Sanitarium, St. Louis. Small octavo of 75 pages and 26 illustrations. C. V. MOSBY COMPANY, St. Louis, 1918.

This is a reprint of an article which appeared in *Surgery, Gynecology* about three years ago and details the experiences of the author with Wyeth's method of treating these blood vessel tumors. The results were very satisfactory.

Johnson's Standard First Aid Manual. Suggestions for Prompt Aid to the Injured in Accidents and Emergencies. Edited by LEO B. KUEHLER, Lecturer in First Aid; Member of St. John's Ambulance Association, the International Congress of First Aid and Life Saving, the American Public Health Association, the Royal Society of Arts. In collaboration with Eminent Surgeons, First Aid Authorities and Specialists. Illustrated. Eighth Edition Revised. JOHNSON & JOHNSON, New Brunswick, N. J.

The practical application of first aid methods calls for a widespread knowledge of the underlying principles among those whose duties place them in a position to take advantage of first aid methods. Elaborate treatises or highly technical books are of minimum value for imparting instruction to the average layman. Johnson's First Aid Manual has been compiled in such a way as to reflect the ideas, methods, and experience of surgeons, teachers, first aid workers in every field of industrial life, so as to provide for a reasonably definite uniformity of methods and materials.

The text has been re-written and is characterized by simplicity, clarity, and definiteness. From beginning to end, the essentials of first aid are presented without a waste of words or the useless discussion of impractical methods. The richness of illustrations, unusually well selected, supplies a vast fund of information that appeals to the eye and is explanatory of the context.

Familiarity with the manual should enable any intelligent layman to gain the fundamental information enabling him to act wisely, sanely, and efficiently in the face of emergencies endangering the lives of those who may have suffered from accidents. The manual is to be highly commended for its compactness, excellent arrangement, fullness of illustration, thoroughness, comparative freedom from technical terms, and its careful presentation of the essential facts requisite for prompt aid to the injured in accidents and emergencies.

Tumors of the Nervus Acusticus and the Syndrome of the Cerebellopontine Angle. HARVEY CUSHING, D. D., Professor of Surgery at Harvard University. Octavo of 296 pages with 262 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1917. Cloth, \$5.00 net.

This monograph is a study of thirty verified and three unverified cases of tumor of the acoustic nerve. Like Cushing's classic monograph in tumors of the pituitary gland. This book is a model presentation. Cushing begins with a most readable essay on the historical aspect. The 33 cases are then reported in utmost detail. There follow summary chapters on the symptomatology, physical signs and pathology of these tumors, and the book concludes with a description of the operative technique. A comprehensive bibliography is added. It need hardly be commented upon that Cushing has made the fullest possible use of his material so that this monograph will be the last word on this subject for many years to come.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor in the Jefferson Medical College, etc.; assisted by LEIGHTON F. APPELMAN, Instructor in the Jefferson Medical College, etc. Volume II. June, 1918. 376 pages; illustrated. LEA & FEBIGER, Philadelphia and New York, 1918.

The contributors to this number are John G. Clark, William B. Coley, Edward Jackson, O. H. Perry, Pepper, and Abraham O. Wilensky. The subjects covered are hernia, abdominal surgery, gynecology, disorders of nutrition and metabolism, diseases of the glands of internal secretion, of the blood and spleen and ophthalmology. All of these review the entire literature of the past year; the discussions are written with their usual excellence and are amply illustrated. For the busy practitioner the volume is valuable in giving a summary of the latest advances.

Progress in Surgery

A Résumé of Recent Literature.

Perforated Gastric and Duodenal Ulcer; a Statistical Report of Fifty-nine Cases. F. J. SCULLY, Chicago, *American Journal of Medical Sciences*, June, 1918.

These 59 cases occurred between the years 1911 to 1916 in the Cook County Hospital; 48 were gastric, 11 duodenal. In proportion to the total number of ulcer cases admitted, perforated gastric ulcers occurred in 9.4% and perforated duodenal ulcers in 15%. Of the perforated gastric ulcers, 44 occurred in males and 4 in females; all the perforated duodenal ulcers were in males. The majority of the perforated gastric ulcers occurred between the ages of 30 and 40; in duodenal ulcer between 20 and 30. There were previous symptoms in 35 cases of both groups; 16 gave no history of previous gastric disturbance. In 29 cases there were premonitory symptoms; the most constant symptom was pain in the upper abdomen. In almost every case the onset was sudden, with severe pain in the epigastrium; in gastric ulcer the maximum point of intensity was to the left of the median line; in duodenal ulcer, to the right. Vomiting occurred in 41 cases. In a large proportion of cases, period of remission of the symptoms was noted after the onset. The maximum tenderness usually corresponds to the location of the maximum subjective pain. Rigidity, especially of the upper abdomen, is usually marked. Fluid was diagnosed in 20 cases. In the early stages, the pulse was not increased in rate. It is worthy to note that in cases that recovered the pulse was never as rapid as in cases which resulted fatally. Operation was done in 49 cases. The remaining ten were moribund on admission. The most common site for perforation of gastric ulcer was the anterior wall near the pylorus along the lesser curvature. In all the duodenal ulcers, the perforation was anterior, near the pylorus. In the majority of cases, simple closure by the Lembert suture was done. Gastro-entrostomy was performed five times. Of the 40 cases gastric perforations operated upon, 24 died; of 9 cases of duodenal ulcer, 4 died. His statistics prove conclusively that the earlier the operation the lower the mortality.

Congenital Pyloric Stenosis. W. E. LADD, Boston. *Boston Medical and Surgical Journal*, June 6, 1918.

Ladd reviews the symptomatology and physical signs along classical lines. Ladd does not believe that one can always feel a tumor. Furthermore, even when a tumor is palpable, it does not mean that one is dealing with a true case of stenosis. Ladd regards pylorotomy (Rammstedt operation) as by all odds the operation of choice. The mortality is far lower than that obtained by gastro-enterostomy. Of 26 cases operated in the Children's Hospital, Boston, 4 died, a mortality of 15.3%. Of the fatal cases, 2 never had operative risks; the third probably should not have been operated because it was not a true stenosis. The fourth patient died from an unknown cause. The indications for the operation are the following: A typical story and physical findings, loss of weight and failure to improve after medical treatment. In doubtful cases, the x-ray will often settle the question. Medical treatment should not be persisted in until the baby becomes a poor surgical risk.

The Disturbances of Acid Secretion Accompanying Ulcer of the Stomach or Duodenum and the Changes Following Operation. ABRAHAM O. WILENSKY. *Surgery, Gynecology and Obstetrics*, May, 1918.

The dominant features of the post-operative studies are as follows:

1. A normal secretion follows most frequently operations for acutely perforated ulcers.
2. An ante-operative subacidity usually persists after operation.
3. There is no rule which governs the sequence of events in the majority of the cases of post-operative moderate and extreme degrees of hyperacidity.

4. Resection of the stomach may be followed by conditions of anacidity.

Meckel's Diverticulum as a Cause of Surgical Lesions. A. L. McDONALD, A.B., M.D., *The Journal-Lancet*, May 1, 1918.

Meckel's diverticulum is a definite structure, and when present shows a characteristic group of possible clinical conditions.

Certain anomalies of the umbilicus depend on persistence of portions of the vitelline duct, and, in a considerable proportion of cases, are associated with intra-abdominal anomalies.

The history of such umbilical conditions in infancy is extremely important in suggesting the possibility of a Meckel's diverticulum as the cause of obscure abdominal conditions later in life.

In the absence of previous abdominal inflammatory lesions, bands causing intestinal obstruction should be examined most carefully for Meckel's diverticulum and treated accordingly.

Intussusception in older children and adults—the variety developing high in the ileum, and compound forms—are frequently due to inversion of a Meckel's diverticulum, forming an intestinal polyp which may be easily overlooked.

Gastroenterostomy—The Stoma and the Efferent Loop. W. HOWARD BARKER, M.D., *Interstate Medical Journal*, January, 1918.

On the basis of the experimental data presented, and on its clinical application to date, the following recommendations are offered:

For normal or hypertrophied stomachs, the nearer the artificial stoma coincides with the physiologic point of outlet, the greater is the efficiency of the stoma. The stoma should be a perpendicular one.

For stomachs dilated beyond apparent hope of regeneration, the transverse mid-fundic stoma seems most efficient.

For moderately dilated stomachs or stomachs in which an appreciable return of original tonus may be expected, a perpendicular antral stoma seems most efficient.

Whenever possible, the jejunum should be so chosen that the portion to be anastomosed falls naturally along the line of the proposed gastric opening. Excepting in atonic stomachs, in most instances the course of the efferent loop will be downward or downward and to the right.

Secondary Tuberculous Peritonitis. W. J. MAYO, ROCHESTER MINN., *Journal American Medical Association*, July 17, 1918.

Tuberculous peritonitis is not a primary disease, says Mayo, but is secondary to some focus of infection, the removal of which is desirable or essential. He calls special attention to the female genitalia as this local focus, and especially to the good effects in some cases of the removal of the fallopian tubes, which are usually open in tuberculosis. This is different from the condition that exists in gonorrheal infection, in which the fallopian tubes are closed and pus tubes are frequently formed. In tuberculosis tubal retention is much less common and the tuberculous infection passes out into the abdominal cavity, causing a more or less generalized peritonitis. Such peritonitis is essentially a conservative process leading to the destruction of the noxious agents and the case may cure itself or a cure may follow simple laparotomy. The way the tuberculosis develops in the tubes is due to the susceptibility of their ciliated epithelium like that of the pulmonary tract. He holds that removal of the tubes may be expected to cure unless some other incurable tuberculous lesions coexist. It is not at all necessary to remove the ovaries or the uterus. Barker estimates that 50 per cent. of cases of tuberculous peritonitis are due to the bovine germ, and approximate estimates have been made by English and German observers. It may be that bovine tuberculosis has a more favorable prognosis than human tuberculosis. The possibility of cure of tuberculosis by simple laparotomy when the local focus cannot be discovered and removed is, Mayo says, limited to the ascitic forms of the disease, but he thinks the surgical profession has been over enthusiastic in regard to the simple operation. The fibroplastic types are benefited only if there are sacculations containing fluid; but operation is contraindicated when the adhesions fill the entire abdomen. The English

will be seen from this brief summary that the cases of tuberculous peritonitis, in which surgical treatment promises to be of great aid, rather naturally divide themselves into two groups: First and most favorable are those cases in which a definite anatomic portion or viscus of the peritoneal cavity is involved, such as the fallopian tubes, the ileocecal coil, and the appendix, which can be removed. Second, and less favorable, are those in which the peritoneal cavity contains a considerable quantity of fluid, occupying either the entire peritoneal cavity or a large part of it, or in which the fluid is contained in loculi composed of peritoneal adhesions, dividing the peritoneal cavity into compartments containing fluid."

Acute Intussusception of Infants, with a Consideration of Its Treatment Based Upon a Modification of the Hirsch-Sprung Hydrostatic Method. LANGLEY PORTER. *Archives of Pediatrics*, March, 1918.

Acute intussusception occurs not infrequently in young children, and is marked by a very definite picture. The onset is sudden, accompanied by intense pain, followed by severe shock, cyanosis of lips, rapid, weak pulse and apathy. The invaginated mass can usually be felt and outlined readily. Resection of the bowel is the only possible procedure in cases that do not come to the physician's hands within 24 or 36 hours of invagination, but owing to the extremely high rate of mortality it is advisable, wherever feasible, to employ other means to disintegrate the bowel. Koch and Oerum, two Danes, report very favorable results with the Hirschsprung hydrostatic method, which briefly is as follows: The child is deeply narcotized. The hips well elevated, and gentle and intermittent pressure employed from the aboral to the oral end of the tumor mass. Then water at about 100° with a pressure head of 25-30 inches is introduced and siphoned off again. These two procedures are alternated until reposition has been accomplished. The writer believes this method to be of great value, but has one difference to offer; namely, that there seems to be no real reason why the abdomen should not be opened and the manipulation carried on in full view of the surgeon. He also emphasizes the need of the greatest patience and gentleness in the manipulation, as the invaginated gut is very soft and tender and apt to tear.

The Sigmoidoscope. G. L. McWHORTER, M.D., Chicago. *Journal of the American Medical Association*, May 11, 1918.

McWhorter, calls attention to the value of the proctoscope or sigmoidoscope in morbid conditions of the lower bowel. The failure, he says, to detect early the large number of diseased conditions in the terminal colon results from a neglect to examine all patients with the sigmoidoscope, however slight the symptoms may be. He gives an analysis of a series of 100 consecutive cases of carcinoma of the rectum and rectosigmoid, showing that the examining finger will not reach far enough into the bowel to verify the diagnosis, and points out how other symptoms may not suffice. Roentgenograms are, of course, of value, but the sigmoidoscope will reach most cases. Twenty-two of the series of 100 were diagnosed carcinoma, and in only one was it located beyond reach of the sigmoidoscope. The chief symptoms of all the cases are given in tabulated form. The coincidence of polypi in carcinoma was an interesting observation in the series, and the author discusses the relations of the two conditions. The unusual frequency of carcinoma with solitary or scattered polypi, he says, should be emphasized, for there is probably a difference of degree in the proper stimulation, such as chronic inflammation or trauma for producing either solitary polypi, or a grave disease, multiple polyposis, in which carcinoma develops early in about half the cases. Prophylactic treatment against all causes of chronic irritation or inflammation of the rectum and sigmoid and active treatment in all stages of polypi are advocated.

Abdominal Injury Due to Blunt Force. HENRY P. DUNCAN, M.S., M.D. *American Journal Diseases of Children*, April, 1918.

The author describes clearly and in considerable detail an unusual and very misleading case of injury to the kidney due to blunt force. The falling from a hobby-horse which, in turn, fell upon her, the back of the saddle falling directly across her body at the level of the navel. Physical examination showed only a tenderness on the right side at the lateral border of the eleventh rib. Stools and urine were normal and there were no classical appendix signs. The temperature rose to 103.5 and then gradually decreased to normal within about ten days. Exploratory laparotomy was suggested but, as the child seemed to be improving, it seemed unnecessary. A month after the accident however, the abdomen was opened, and the right kidney was found to be seriously injured. The capsule formed the wall of a tremendous tumor which had displaced all the abdominal organs. The child died shortly after operation, and the case is reported in the hope that in case of similar injury, earlier surgical interference may be deemed advisable.

Diagnosis of Urinary Lithiasis, with Special Reference to the Value and Limitations of the x-Ray Examination. ABRAHAM HYMAN, M.D., F.A.C.S., *The Urologic and Cutaneous Review*, March, 1918.

A diagnosis of renal or ureteral calculus, based on the history, physical examination and urinalysis, will in many cases prove to be incorrect.

A diagnosis based on x-ray alone, will often lead us into error, because in a certain number of cases, just how large a percentage I cannot say, extra-urinary shadows will be mistaken for intra-urinary shadows.

Negative radiograms are not to be accepted as proof of absence of stone, because, in renal lithiasis, approximately 60 per cent. of the calculi fail to cast shadows, and in ureteral calculus about 20 per cent. are missed, whereas in vesical stone, as high as 60 per cent. fail to cast shadows.

To reduce to a minimum the possibility of error, cystoscopy and ureteral catheterization should be employed in every case, supplemented frequently by functional tests, the opaque catheter, stereoscopic plates, pyelourethrography and the passage of the wax-tipped catheter.

Bladder Drainage. H. P. JACK, M.D., Hornell, N. Y. *Journal of the American Medical Association*, April 27, 1918.

Jack describes an adaptation of the use of the Murphy button, one half of which is inserted into the end of a large rubber tube, the rubber end surrounding the button closely about its shank. The other half of the button, surrounded down to its shank by a soft rubber ring, if desired, so that it will not cut through too quickly, is placed inside the bladder through a small slit. The bladder tissues are brought firmly about the shank of this half of the button, and the two halves are pushed closely together. This gives a perfect joint and enables one to use his drain as much or as little as he pleases. If not satisfied as to the perfect drainage, another and smaller tube may be introduced inside of the larger one, clear to the bottom of the bladder. Forty-eight hours after this operation, which is usually performed under local anesthesia, quinin and urea hydrochlorid, four-hour washings of the bladder are begun. He has used this technic in ten cases of prostatictomy with utmost satisfaction, and it has saved much suffering to the patient. He has never used the rubber ring suggested. The button has always remained in the tissues without cutting, for two weeks. Should it be desired to keep the button in place for a much longer period, the use of the ring is obvious. The incision into the bladder may be of sufficient length to allow search for, and removal of, stones which is imperative.

The Mechanism of Obstruction in Prostatic Adenoma. A. HYMAN, M.D. *Annals of Surgery*, April, 1918.

The obstruction to the outflow of urine in cases of lateral lobe enlargement is potential, and regularly due to blockage of the urethra by the lateral lobes during efforts of forced urination.

A Practical Consideration of Urethral Stricture. CLARENCE MARTIN, M. D., *The Urologic and Cutaneous Review*, July, 1918.

Modern and well executed treatment of gonorrhea is prophylactic of stricture.

Easily 95 per cent. of strictures may be treated by dilatation.

Gentleness and deftness are absolutely essential in their management.

Through anesthesia and lubrication, coupled with patience, succeed in most "impassable" strictures.

Undilatable and resilient strictures, and urinary infiltration, abscesses and fistula demand urethrotomy.

Where urethrotomy is held necessary, the combined internal and external operation, employing the Maisonneuve urethrotome for the former purpose, is best.

Any stricture that will permit the passage of a filiform, may be subjected to an internal urethrotomy with the Maisonneuve.

External urethrotomy without a guide is very, very rarely necessary.

In no other department of surgery is there greater need for skill, experience and thorough training as in this.

Let a urethrotomy be done only when simpler measures fail, and let a trained urologist be judge.

The Essentials of Success in Prostatic Surgery. ERNEST M. WATSON, S.M., M.D., *The Canadian Medical Association Journal*, April, 1918.

There has been a notable reduction in the mortality following prostatectomy in the hands of competent surgeons and this has been due to improvement in operative technic, but in a much greater degree, to the careful study of the individual patient and the determination of his physical condition by the recent clinical and laboratory methods.

The first essential, obviously, is to arrive at a correct diagnosis of the nature of the obstruction. The next step, and perhaps, the all-important one, is the ascertaining of the exact physical status of the patient; this goes hand in hand with the requisite, proper preliminary treatment. Here, much can be gained by a study of the capacity of the kidneys to excrete dye and by an examination of the blood for retention products of nitrogenous wastes. The third point of importance is the selection of the proper time for operation. One should defer operation upon cases in which there is marked cardiovascular involvement or in which there is epididymitis or pyrexia.

For the general operator the suprapubic route of operation is safest; in the hands of trained, experienced surgeons, the perineal route gives a lower mortality. Watson quotes the latest figures of Young.

The post-operative care of prostatectomized patients is not difficult but calls for no relaxation of the vigilance and skill required during the entire course of care of these cases. Hemorrhage, acute retention, epididymitis, and thrombosis, though not frequent as post-operative sequelae, occur even under the best possible care. They should be met with promptly and rigorously.

Surgical Treatment of Epididymitis. R. L. COOK, San Antonio, *Journal American Medical Association*, April 6, 1918.

Cook, considering only subacute and acute gonorrheal epididymitis, on the basis of his experience with 276 patients since entering on his work at Fort Sam Houston, combats the upholders of non-operative treatment in this disease. The almost immediate relief from pain, which follows operation, would alone justify it, and the beginning hydrocele which accompanies it is also relieved. He concludes also that the operation and discharge of pus which occurred in 33 of his cases is more apt to save the function of the organ, than are palliative measures. The breaking up of the adhesions to the parietal layer of the tunica vaginalis is most essential, and is best done with the finger and a piece of gauze. Any lymph collecting between the layers of the tunica vaginalis should be removed with the gauze! He describes the technic of the operation, which should be done in all cases, and says he has had only one case, not attributable to gonorrhea. His results have been uniformly favorable.

Dislocation of the Knee. R. S. FERGUSON, M.D., New York, *Journal of the American Medical Association*, April 27, 1918.

Ferguson finds that dislocations of the knee comprise only about 1 per cent. of all dislocations, and outward dislocations are exceeded in rarity only by inward dislocations and the dislocations by rotation. Dislocation of the knee outward occurs in about 0.2 per cent. of all cases of dislocation. He reports a case of a young German, who, while crossing a dark road, was struck from the right side by an automobile. The bumper of the car hit the patient just above the knee joint, while the foot was fixed on the ground. On admission to the hospital, the patient complained of great pain and was unable to carry out any voluntary motion of the leg. The lower leg was abducted from the knee about 10 degrees from a straight line, rotated outward about 20 degrees, and in complete extension. "The internal condyle of the femur was seen to project under the skin on the internal aspect of the knee. The patella occupied a vertical position on the lateral aspect of the external condyle. The external tuberosity of the tibia was displaced outward and backward. The internal tuberosity was occupying a position in line with the external condyle of the femur, and was displaced slightly in a forward direction. On palpation, the entire internal condyle and the intercondylar groove of the femur could be felt. The patella was absent from its normal position, and could be felt in a vertical plane on the lateral aspect of the external condyle of the femur. The entire external articular surface of the tibia could be palpated, even to the spine separating the two articular surfaces on the head of the tibia. The articular surface of the external condyle of the femur and of the internal articular surface of the tibia exactly coincided. The patient was unable to carry out any voluntary motion of the leg. Passive motion and even light palpation caused exquisite pain." Reduction was done under chloroform. The leg was flexed completely at the knee and at the hip. After flexing, the lower leg was internally rotated, traction was made on the head of the tibia, and the leg was extended. After extension the patella was easily slipped back into its normal position. A light splint was applied to prevent abduction and keep the leg in extension. After four days a light plaster splint was put on to immobilize the joint. After one week's time it was split into anterior and posterior splints, and the knee massaged three times a day. The author gives his theory of the etiology and describes his experiments on a cadaver, and the findings on its dissection. He concludes that incomplete traumatic dislocation of the knee outward may follow abduction at the knee without rotation of the lower leg. This causes an oblique tear in the internal lateral ligaments and joint capsule, extending from the posterior border of the internal condyle of the femur to the lower pole of the patella, with rupture of the anterior crucial ligament. The outward rotation of the leg seen in the cadaver when the dislocating force was pure abduction, seems to result from the action of the untorn posterior crucial ligament. To conserve the posterior crucial ligament and other untorn ligaments the mechanism of reduction should be by flexion of the hip and knee, combined with the necessary amount of inward rotation. This may be followed by full extension and immobilization of the leg.

Blue Sclerotics with Brittle Bones. J. B. HARVIE, Albany, *Albany Medical Annals*, May, 1918.

Harvie describes two cases of this rare malady. The first was a boy five years old, who, in his short lifetime, had six fractures of the long bones. He also had blue sclerotics. The boy's mother and one brother also had blue sclerotics and multiple fractures. The second case was a woman, 42 years of age, who had suffered from numerous fractures and had blue sclerotics. There was no family history of the malady in her case. Harvie reviews some of the literature of this condition. While blue sclerotics were noted in 1841 by Ammon, the tendency for such patients to acquire fractures from comparatively slight trauma was first pointed out by Eddows in 1900; he also pointed out the hereditary nature of this condition. Conlon found that the x-ray showed enlarged medullary canals and clearly defined cortices, all bones showing lack of density and marked atrophy.

The Restoration and Repair of the Wound, Combating

Contamination and Infection. *Major F. C. Kidner, M.D.*

Medical Director, Shepherd's Bush Orthopedic Hospital, London, England.

There are four main reasons why the treatment of wounds is so difficult: (1) the nature of the wound; (2) the position of the wound; (3) the nature of the patient; (4) the nature of the surgeon. The first reason is the nature of the wound. Wounds may be superficial or deep, clean or contaminated, and may involve different parts of the body. The second reason is the position of the wound. Wounds in certain parts of the body, such as the head, neck, and chest, are more difficult to treat than wounds in other parts. The third reason is the nature of the patient. Patients may be healthy or debilitated, and may have different degrees of shock. The fourth reason is the nature of the surgeon. Surgeons may have different degrees of skill and experience, and may have different opinions as to the best method of treatment.

An open, fairly superficial wound without in accessible areas does admirably with normal saline, Carrel-Dakin, "b. i. p." eusol or electric light—perhaps best of all by the last named. A wound with deep injured areas will do well treated by the Carrel-Dakin method or "b. i. p." In a great rush, "b. i. p." is indicated.

Choice of methods in the period of acute infection. With free incisions: the best posture and physiologic rest what further treatment is indicated for: (1) accessible areas; (2) inaccessible areas; (3) in stress of work; (4) when nursing and professional staff are inadequate.

If conditions permit, the best single treatment undoubtedly is hot packs; in time of stress, "b. i. p."; in deep wounds, dependent drainage; in quiet times, Carrel-Dakin. When the wounded come in waves, and surgeons and nurses are swamped, incision and "b. i. p." give the best results to the greatest number per surgeon. But "b. i. p." must be spread on thinly, not applied in masses, and the wound should not be sutured but should be lightly packed.

Choice of antiseptic methods in the stage of healing. In accessible wounds, the best treatment consists of sunlight or electric light, with eusol or Wright's hypertonic solution, and hot packs applied for an hour night and morning. In the absence of sunlight or electric light, however, use a protective dressing. In deep inaccessible areas—granting always dependent drainage and physiologic rest, use "b. i. p." or instead of drainage pooling with Carrel-Dakin. It must be remembered that owing to the lack of dependent drainage, if Carrel-Dakin goes wrong it goes badly wrong.

Meaning of physiologic rest. Physiologic rest implies no irritating dressings, comfortable position, no compressing bandages, no painful handling, even and balanced muscular pull, no accumulation of wound discharges, apparatus that will permit necessary moving about in bed without breaking physiologic rest.

Reconstructive Surgery in War Time. F. C. KIDNER, M.D. (Detroit), England. *Journal of the American Medical Association*, April 27, 1918.

Kidner describes the methods of reconstructive surgery used in the Shepherd's Bush Orthopedic Hospital for soldiers, one of fifteen or twenty orthopedic hospitals organized and supervised by Dr. Sir Robert Jones. Fundamentally both the problems and the methods of treatment are the same, he says, as those of orthopedic surgery in civil life, but in details they are radically different. This is due to several factors, first among which, stands sepsis. Nowhere in private life do we meet such persistent and severe sepsis as is seen among the wounded soldiers. Second in importance comes scar tissue, and third, the crippling is often so severe and widespread that difficult problems of judgment arise. The greatest number of cases are those that involve bone injury, and fixation in perfect position is imperative. After fixation, thorough and complete drainage and counter drainage are the most important measures. Carrel's technic is useful but not infallible. The Thomas knee splint is specially mentioned as being adapted to these cases. With proper fixation and satisfactory drainage it is found that sepsis clears up, and that union in good position is obtained. The second great class of bone injuries are badly united or ununited fractures, with discharging sinuses, due to necrotic bone. Some of them have never been properly treated, and in others proper treatment has failed on account of the exigencies of military service. The removal of sequestrums must be done with careful aseptic treatment and thorough drying and cleaning of the whole wound. In treating the joint that stiffens during the treatment of fractures the

problems are the same as those seen in civil life, but they are aggravated by the attempts to mobilize them often causing a flaring up of the original sepsis. Experience has shown that it is rarely safe to use force on such joints, and it is best to depend on massage and exercises. The second class of firmly united deformed fractures almost invariably can be improved, and the keynote of treatment is thorough breaking up of the vicious union, and molding the fragments gradually into proper position. The operations may be difficult and tedious but are worth while. The joint injuries and infections are those of civil life exaggerated. Where there has been large destruction of bone, bone transplantation is invaluable. Most of the gunshot wounds of the joints come to the hospital after thorough operation at the front. In the simple penetrating wounds the joints have often been closed tight, and generally do well if the closure is permanent. Even when drained joints become permanently stiff, they are more useful than an amputated limb. Mobilization of stiff joints still presents many problems, but the vast majority can be brought to a useful range of motion. Kidner lays down the following rules: The painful, sensitive joint, should be absolutely rested and not moved; improvement of muscle tone is called for here; a painless stiff joint should be treated with a minimum of trauma; gradual progressive force applied over a long period accomplishes more than sudden manipulation; and lastly, stiffness in bad positions should always be corrected, so that if the patient is to have permanent loss of movement he shall have a useful limb. In nerve injuries connective tissue formations cause most serious difficulty. Scar tissue around bone, muscles and nerves, when it interferes with motion should be excised as widely as possible and the fresh tissue brought together, taking care that there is no latent infection. It is impossible to say how long this may exist. Peripheral nerve injuries are very common in war wounds and are of all types. A careful review of nerve and muscle anatomy will be of the greatest value to any surgeon who has to treat war wounds. Complete lesions of nerves due to any cause must be explored and sutured, resected or cleared. The technic of nerve suture should be as simple as possible. In general the results are very encouraging, but success is dependent on early operation, and careful electrical after-treatment. Kidner says that the orthopedic hospitals in England have caused the rehabilitation of thousands who before this war would have been discarded as crippled.

The Importance of the Workingman's Hand and Its Treatment When Involved in Sepsis. EDWARD H. REISLEY, M.D., F.A.C.S., *Interstate Medical Journal*, April, 1918.

The great importance of considering the septic hand from an economic point of view from the very start of the infection till the man is back at work again.

The great importance of bed treatment for every case of septic hand or hand infection.

The reduction in the number of secondary operations necessary when this method is carried out and the longer course of treatment necessary even when under the most ideal out-patient or ambulatory treatment.

The general treatment should not be neglected. Splints should always be employed at the very onset of every finger or hand infection.

Edema of the dorsum is a very common sign, but more often it is an accompaniment of palmar pus than an indicator of a dorsal focus.

Some degree of lymphangitis is found present in practically every case if looked for early enough.

Of the two forms of inefficient surgery "cutting bone" is far more dangerous than the so-called medical incision, which often relieves tension and produces drainage enough to be helpful rather than otherwise.

Lateral incisions are of the greatest value and less liable to open up uninfected tendon sheaths.

The early establishment of passive motion and massage, especially to the unaffected parts of the hand, is of utmost importance in shortening the period of disability.

Tendon involvement is by proper care preventable and is a far too common occurrence.

Early plastic operations or amputations are desirable after a thorough preparatory course by Zander treatment.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

OCTOBER, 1918.

No. 10

UTILIZING THE FALCIFORM LIGAMENT AS AN ADJUNCT GASTROPTOTIC SUPPORT.

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Surgical intervention in gastropotosis is only indicated in a small percentage of the cases that present themselves to the special or general man for treatment. It is the writer's observation that 85%

cular structures of the stomach only, from cardiac greater curvature end to the pylorus, thence out through the entire thickness of the abdominal wall; the sutures are tied over skin placed glass rods, the latter gauze covered, thus retaining the four suspending sutures until the freshened anterior stomach wall has ample time to become fixed to the peritoneal surface of the anterior abdominal wall.

Each of these methods obviate respiratory movement of the stomach, Rovsing's technic more so



Fig. 1. Case No. 1. Position of stomach 10 days previous to operation. Mrs. M., aet. 38, school teacher. Operation Beyea-Crouse technic.

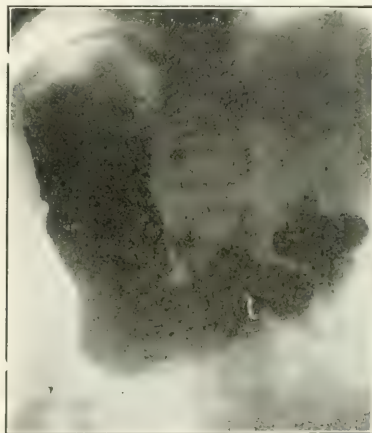


Fig. 2. Case No. 1—Illustration No. 1. Mrs. M., 2 years subsequent to operation patient gained 25 lbs. All cases should be followed up with a fat-producing diet and the same tonic treatment as one uses with the non-operative case.

of such cases answer to various mechanical methods, dietary and medicinal treatment. Of the remaining 15%, surgical treatment will be demanded ultimately in rectifying a gastric malposition. Three technics have heretofore been devised and used, two of which have the glaring fault of neutralizing one of the chief aids in normal digestion, namely, the physiological synchronous movement of the stomach and diaphragm in respiration. These two are: (1) The basket support given the stomach and transverse colon by suturing the great omentum to the peritoneal surface of the anterior abdominal wall in a wide crescent, devised by Coffey; (2) Rovsing's series of four sutures passing in a basting way equidistant across the longitudinal surface of the stomach, biting into the serous and mus-

than Coffey's. Rovsing's method further leads, if the needle bite has not been gauged nicely, to gastric fistulas, and further has the surgical fault of utilizing a skin to stomach continuous suture, an extremely weak aseptic technic.

Coffey's omental basket support, coupled, as it frequently is, with plastic enlargement of the upper abdominal wall, together with overlapping of the lower muscular half, is an operation of too exhaustive a nature for the type of patient it is utilized upon; technically it is skilful, but practically it overlooks the weakened vitality of the subject it is planned to aid, a surgical fault of increased risk.

Beyea's operation is the only one of the three that has the physiological quality of digestive demands, namely, it permits the free movement of

the stomach during respiration, thus increasing the gastric blood supply through the up and down pumping strokes of expiration and inspiration.

Beyea plicates the gastro-hepatic omentum through a series of tucking sutures running from lesser stomach curvature to the closest point possible to the lower surface of the left lobe of the liver. Beyea's method acts ideally, provided that thinning out of the omentum, an endothelial structure, has not occurred to the degree that there remains insufficient material to fold and serve as a supporting medium for the stomach.

I frequently have been dissatisfied with the available gastro-hepatic omentum in severe gastropototic cases, the long-existing drag having excessively thinned the lesser omentum. Searching through

Selecting this structure, the following operative steps were devised:

The abdomen is opened slightly to the right of the median line, in fact, through the right rectus to avoid incising this peritoneal wing of the falciform ligament. The length of the incision extends from ensiform cartilage to the umbilicus, thus giving ample area for appendical removal, left lobe of the liver elevation, or separation of omental adhesion, the latter a frequent cause of gastropotosis. The round ligament, its rounded substance standing out from its falciform peritoneal wing, is sought at the umbilical end, is then incised with curved scissors, then tagged with an intestinal forcep. The peritoneal wing is strained upon to demonstrate to the fullest its abdominal wall attachment, to the

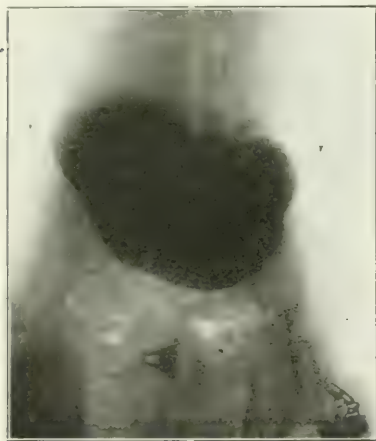


FIG. 3. Case No. 7. Illustration No. 1.

Mr. J. B. had been treated by means of diet and mechanical support, 14 months, no improvement. Operated upon April, 1918, Beyea-Crouse method. Cause of Gastropotosis Omentum adherent to retro-peritoneum caput coli and hepatic colonic angle.



FIG. 4. Case No. 8. Illustration No. 2.

Mr. J. B.—30 days subsequent to operation, the lift in the case being $4\frac{1}{4}$ inches, with thorough tonic and dietary treatment, be markedly improved in the next year. All pictures taken patient standing.

the upper quadrant of the abdomen for an available material that would retain Beyea's physiological points of a movable stomach, i. e., an indirect diaphragm attached stomach, naught could be found except the round ligament with its wing of peritoneum, the latter the so-called falciform ligament. This peritoneal fold sweeps from the anterior abdominal wall in a varying degree of breadth and thickness, extending from the diaphragm up to the anterior superior surface of the left lobe of the liver down to the umbilicus, infolds the round ligament from the latter's intralobular attachments to its umbilical end. The two—peritoneal fold and ligament—have a distinct wing-like appearance.

left of its attachment a half to one inch or so the peritoneum of the anterior abdominal wall is carefully detached along with the falciform ligament fold up to the latter's most superior abdominal wall area, and down to its umbilical end. The denuded area of the anterior abdominal wall is carefully tagged with intestinal forceps for future whipping occlusion.

The falciform ligament is then, if its thickness permits, carefully split—the fold normally being in two layers—is next tagged, then covered with warm moist saline pads and laid upon the abdomen until the usual Beyea's technic has been carried out. Then the round ligament and falciform peritoneal wing, the latter if split, is placed raw sur-

face down so as to apply to the stomach and lesser omentum, being spread as far over as to include the lesser curvature area of the anterior stomach wall proper, as well as plicated gastro-hepatic omentum, to each of which it is tacked through the medium of 20 day chromic No. 1 gut. The basting sutures used in fixing the ligament and its peritoneal fold to the plicated gastro-hepatic omentum reinforce a weakened endothelial structure with endothelium material, plus ligamentary substance.

Omental endothelium is but a diversified peritoneal structure. When the round ligament and peritoneal wing is added to the plicated gastro-hepatic omentum, from each of which exudates rapidly occur, a thickening and fortifying of the lesser

to the caput coli. The central area of the ascending colon had been skipped by the adhesions, thus resulting in a marked angulation of this portion of the large bowel, a post-typhoidal sequel no doubt. Two of my patients had a previous anterior abdominal wall trauma history, with resulting omental adhesions, by such the stomach was dragged down and fixed.

The accompanying x-ray prints of cases previous to and subsequent to the operative intervention speak for themselves. The writer's technic is briefly outlined with explanatory sketches.

This operative suggestion has the support of eight patients whom it has benefited.

THE GROUND GLASS OBSESSION

Rumors continue to appear to the effect that ground glass has been found in food and that an investigation is to be made by the federal government. During the last two or three years we have passed through a whole series of such nation-wide "scares." Our readers may remember the vogue of infected court-plaster, of the insertion of various organisms into bandages and dressings, of the finding of numerous alleged bombs in different localities. Today ground glass holds the stage. Just why any intelligent spy, or even an unintelligent German diplomat, should choose ground glass to kill off a community is problematical. Neither has anyone explained how enemy sympathizers are going to avoid the alleged manipulated foodstuffs. In works on forensic medicine and toxicology ground glass is mentioned as a mechanical poison. When the glass is coarsely ground it produces mechanical lesions of the lining of the gastro-intestinal canal which become infected. Ultimately the condition resembles a catarrhal and hemorrhagic inflammation. Both may result from perforation of the stomach or bowel, or from infection of the wounds and extension of the inflammation. A meal of very finely ground glass is regarded by some as harmless, and it has been reported that it is even used as a remedy among the peasants of eastern Europe. The concealing of ground glass in flour or in sugar, the two substances most commonly mentioned in the newspapers—any amateur psychologist can figure out why—would necessitate that it be ground very fine. These stories may have a certain value in keeping the public alive to the dangers of the spy peril. On the other hand, they stimulate cranks and other unbalanced persons to "go and do likewise," thus lending a substantial basis to the original imaginative stories.—*Journal of the American Medical Association*.



Fig. 5.

1.—Beyea's operation—first layers of sutures.

2.—Beyea's operation—first layer of sutures completed; the second and third being introduced (after Moynihan).

Beyea's plication of the gastro-hepatic omentum is followed by the writer's reinforcement, using the round and falciform ligament, shown in large view.

omentum results. A return to physiological normal situation of a misplaced organ is brought about, free respiratory movement is permitted and the suspension has not produced a fixed, faulty position.

Omental adhesions, according to my observation, have furnished the chief pathological cause of the 15% of gastroptotic conditions demanding surgical intervention. Such adhesions run the gamut of intrahernial occlusive efforts on the part of the omentum, omental sealings of suppurative appendiceal conditions, infected tubes, plastic attachments of omentum to the sigmoid, the latter the seat of previous ulcerations. In one instance the omentum was rolled, thus shortening itself through a firm attachment to the hepatic flexure of the colon and

CRUSHING VERTEBRAL FRACTURE—REPORT OF A CASE, INCLUDING A BRIEF REVIEW OF RECENT LITERATURE.

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LOUISVILLE, KENTUCKY.

Fracture of the vertebral column, with consequent injury of the spinal cord, represents one of the most unfortunate and distressing accidents which can possibly happen to a living human being. Fortunately, however, such injuries are quite rare when compared with the other fractures.

Vertebral fracture almost invariably owes its origin to traumatic violence externally applied. While crushing injuries and falls are the most common etiologic factors, any form of external violence which produces forcible spinal flexion may cause fracture and crushing of one or more of the vertebræ with more or less extensive spinal cord damage.

Fractures of the cervical and dorsal regions are said to occur more frequently than those involving the lumbar and sacral portions of the vertebral column. Spinal fractures are more commonly noted in males than in females, probably because of occupational differences. The case to be herein reported in detail occurred in a young girl and was due to falling from a considerable height, therefore occupation was not a factor.

According to Hartwell, of one hundred and thirty-three cases of vertebral fracture treated at the Massachusetts General Hospital, eighty-three resulted from falling from heights; twenty-five from being "jack-knifed" by falling weights, etc., the causes in the remainder being miscellaneous.

There were forty-eight cases of deformity in the cervical region; one in the cervico-dorsal region; fifty in the dorsal region; one fracture in the dorsal and lumbar regions; and thirty-three in the lumbar region. Of seventy-six fractures in the cervical region suffered by forty-nine patients, sixty-two involved the fourth, fifth and sixth vertebræ alone or in combination. His tables confirm the generally accepted view that there are two regions of the spine especially liable to fracture, viz., the mid-cervical, and the dorso-lumbar. Isolated fractures of the vertebral processes seem rare; only seven are recorded,—five of the transverse and one each of the spinous and articular processes. In this series of cases process fracture resulted from direct trauma body fractures being dependent upon indirect trauma.

"Whenever the injury is of such a nature as to produce a fracture in the vertebræ, it is always accompanied with considerable laceration of the

muscles and ligaments, and often with hemorrhage, which may be extradural or subdural. At times there is crushing of the bodies of the vertebræ, with greater or less displacement."

The symptoms of vertebral fracture are usually so indicative that there would seem little excuse for diagnostic error based upon the clinical signs alone; but at least two radiographic plates should always be made to confirm the clinical findings. Angular deformity is noted where displacement has occurred; gentle manipulation usually elicits crepitation; where the spinal cord is extensively damaged paralysis distal to the fracture site is a characteristic manifestation. However, in slight cord injury paralysis may be incomplete and thus cause confusion in the clinical diagnosis.

One of the most constant clinical signs is profound shock which may persist for hours or days in the event expectant treatment is employed. On account of absence of the spinal cord in the lower lumbar, sacral and coccygeal segments, fracture involving these situations is unlikely to be accompanied by paralysis, but other indicative physical signs are invariably present.

In severe cord injury complete motor and sensory paralysis immediately supervenes; both superficial and deep reflexes are inhibited; rectal and vesical sphincteric control is lost; in many instances lumbar puncture discloses blood-tinged spinal fluid.

Pain and tenderness at the fracture site are important diagnostic symptoms which must be remembered in studying the clinical manifestations of vertebral fracture regardless of the anatomic situation involved. The extent of the swelling, contusion, ecchymosis, etc., will depend largely upon the character of the causative trauma.

In Hartwell's series of cases, severe signs of cord injury were present in 62.6 per cent.; 43 per cent. had total transverse lesions of the cord; incomplete destruction in 19 per cent. In some of his cases no neurological symptoms were present. A significant fact is that of sixty-seven patients who had signs of cord lesions, in sixty-six the onset of paralysis was immediate,—in the only one was it gradual. Priapism was noted in twenty-seven cases in patients who presented signs of complete cord destruction; therefore, says Hartwell, this is a bad prognostic sign. Strange as the observation may appear, pain at the fracture site was infrequent, being mentioned in twelve cases only. Local discoloration, swelling, or contusion, was noted in twenty-three instances; localized tenderness in sixty-seven; deformity in fifty-one; and crepitation in eight. Post-mortem records showed three cases of fracture of the intervertebral discs, all in the cervical region.

In each there was complete motor and sensory paralysis below the segment of cord opposite the fractured disc with abolition of all reflexes, superficial and deep, and retention of urine and feces. Contrary to the prevailing belief, Hartwell's statistics show that shock is uncommon in vertebral fracture regardless of the accompanying cord lesion, and he believes its presence is indicative of complicating injuries. Shock was noted in only twenty-four of the one hundred and thirty-three cases reported.

Elsberg claims certain patients present few immediate symptoms of vertebral fracture, because of slight dislocation of the fragments; but months or years later evidences of interference with the function of the spinal cord make their appearance. "The symptoms are often due to narrowing of the spinal canal by a new growth of bone, or callus has caused a more or less marked angulation of the cord with pressure upon nerve roots. These patients can be entirely relieved of their symptoms by a wide laminectomy, which relieves pressure upon the cord and nerve roots and 'straightens out' the angulation by allowing the dural sac to bulge backward." (Elsberg).

Young records four cases of compression fracture of the fifth lumbar vertebra, in two of which the transverse process was also involved. He claims shock is out of all proportion to the injury; sometimes the patient is even unconscious. Pain is a constant symptom and is increased "on sitting down and getting up." Local tenderness, muscular spasm, and limitation of motion are present; but there are no cord symptoms, such as paraplegia or sphincteric disturbance. Should there be also displacement of the sacroiliac synchondrosis, Kernig's sign may be elicited. A lumbar scoliosis may be present. Disalignment of the spinous processes is a prominent sign. Lesions to be differentiated are: (a) fracture of the transverse process, in which there is never scoliosis, (b) displacement of the ilium, which is not accompanied by disalignment of the vertebrae, (c) lateral deviation in Pott's disease, in which kyphosis is the differentiating sign, (d) rachitis of the pelvis, which would be associated with other signs of rachitis, (e) malignant disease, (f) arthritis deformans, in which diagnosis can be made by roentgen picture.

According to Ely, in various lesions of the lumbar spine, inflammatory and traumatic, if the patient be placed upon his face, when his knee is flexed his pelvis on that side will rise from the table. The exact reason for this phenomenon is somewhat difficult to understand, but it helps to differentiate lumbar from sacroiliac lesions, having possibly in

the former the same value as Kernig's sign in the latter.

The treatment of vertebral fracture represents one of the darkest chapters in the history of surgical achievement, the mortality being greater than that attending the management of any other type of osseous injury. This is readily explained by the fact that in the majority of instances more or less damage is inflicted upon the spinal cord tissues. It is obvious that where the cord is entirely severed no benefit is to be expected from any method of treatment, and continuation of the paralysis and dissolution of the individual is only a question of time. However, in incomplete lacerations the prognosis from radical surgical intervention is less unfavorable. "The prognosis of fracture of the spine, especially when it occurs in the upper spinal region, is very unfavorable; if the patient should recover from the shock attending such injuries, he is very likely to be paralyzed the rest of his days."

Elsberg remarks that many of these patients live a number of weeks remaining paralyzed, the final outcome being ushered in by high and irregular fever. Others remain alive for months or years, and succumb to bed sores and kidney infections. In a few improvement follows, the reflexes return, motor and sensory powers are re-established to a considerable extent, and after months or years the patients are able to get about with the aid of crutches or canes. The improvement which occurs is an evidence that there could not have been a complete transverse crushing of the cord. Such a course is rare, however, and the symptoms of a complete transverse lesion of the cord will generally persist to the end uninfluenced by operative treatment. Therefore it is useless to subject these patients to operation, and the surgeon must not be misled by the return of some of the tendon reflexes. The author has, in several instances, observed a very slight knee-jerk return for a few days, many weeks after a complete transverse crush of the cervical cord. "One of the reasons why laminectomy for fracture of the spine has fallen in disrepute is that so many patients with a hopeless lesion have been operated upon." The situation is quite different with patients in whom paralysis is incomplete, in whom there is incomplete loss of sensation upward to the level of the injury, in whom some of the reflexes persist and are perhaps exaggerated. The majority of these should be operated upon as soon as possible after the injury, especially if the x-ray shows marked distortion of the spinal canal by fractured bone or dislocated vertebral bodies. It is a well known fact that slight trauma of the spine may be the starting point of

a hematomyelia, and it is very possible if not probable that injuries of mild character may be an important etiological factor in many cases of spinal disease. If one carefully inquires into the history of patients with spinal diseases, it is quite remarkable that one will very often learn of an injury to the back which preceded the spinal affection by many years. (Elsberg).

Sharpe urges early operation in injury of the spinal column with involvement of the cord, whether trivial or serious, and reports ten illustrative cases. Although actual damage by bony pressure may already have occurred, great additional nerve destruction may result from hemorrhage and edema. Laminectomy performed as soon as the immediate shock of the accident has subsided, with opening of the dura thus removing pressure upon the cord, will prevent further injury and give the best possible chance for recovery. He states that in partial lesions of the cord, destroyed, damaged and sound fibers are found side by side, and if compression is quickly removed, not only the sound fibers be preserved but functional and even anatomic repair will occur in many of the damaged but not destroyed fibers. Inasmuch as the cord fibers, if damaged and compressed, may degenerate within four days, the author disagrees wholly with those who would postpone operation until the "blood clot is absorbed." From the viewpoint of symptoms he divides the cases into: (a) those with partial abolition of function, and (b) those with immediate and complete abolition. The treatment of both classes is, however, the same. The object of the operation is sufficient removal of bone to afford ample room for the cord, and free opening of the dura for removal and drainage of blood. The dura may be re-closed or not as indicated by the condition of the cord. As regards suture of completely divided cord, although the function cannot be restored, great improvement following suture in the sensory and trophic disturbances thus avoiding terrible bed sores, warrants the procedure. The author states that of five cases of suture reported, four of the patients were living several years after the operation, while without suture no patient has lived one year. In cases where suture it attempted, if the ends cannot be approximated and the lesion is in the dorso-lumbar region, an effort should be made to unite the roots above and below the lesion. (Sharpe).

There has hitherto existed much disagreement concerning the merits and demerits of laminectomy in the treatment of vertebral fracture, and even at present surgical opinion is apparently hopelessly divided. However, it would seem reasonable to

suggest that where complete transverse section of the cord has not occurred, benefit in a certain percentage of instances may be expected to accrue from the performance of laminectomy with repair of the cord damage if possible. Where the cord has been completely severed, the statement of Elsberg is undoubtedly correct, that the case is hopeless from the beginning and operation is useless. "In our operations for spinal disease or injury, we have used different methods of approach (curved and straight incisions, hemilaminectomy and complete laminectomy) and various instruments, and I have arrived at the conclusion that the complete removal of the spinous processes and laminae is the simplest and most reliable method for the opening of the spinal canal. Complicated instruments are unnecessary. After the exposure of the spines and laminae by a straight incision and the separation of the muscles, the spines are removed at their bases with large rongeur forceps, and the laminae are 'bitten away' with smaller rongeurs of various sizes and patterns. For the exploration of the spinal canal, a defect of at least 1 cm. in width should be made, so that all sides of the cord can be investigated with the minimum amount of handling of the delicate cord tissues." (Elsberg).

Leriche operates under ether anesthesia, after disinfection with tincture of iodine, with the head slightly lowered. The exploration is made by the classical methods, to which radiographic examination of the vertebrae is added when absolute precision is necessary. The incision is made just to one side of the median line and the muscles carefully dissected with rugine; but the dissection is subperiosteal in name only. Hemostasis is accomplished by pressure with tampons placed in the musculospinal groove. The spinous processes are then removed with gouge forceps and the medullary canal opened, either with forceps or the aid of Doyen's bit. If a vein bleeds the hemorrhage may be controlled with the aid of a small section of muscle. Then the dura mater, held with two Tuffier forceps, is incised with a bistoury. After radicotomy has been accomplished, Leriche sutures the dura mater with small curved needle and No. 00 catgut, placing the sutures as near together as possible. This being finished, there is a large dead space corresponding to the laminae and spinous processes which have been removed; this he fills with a muscle-flap with the flesh inside, against the dura mater. The muscles are then sutured in several layers; no drainage is used. He reports a mortality of ten per cent.

Nash records two cases of vertebral fracture treated by laminectomy. The first patient was a

male of forty-four who had paraplegia from the lumbar region downward, the ninth and tenth dorsal spines projecting markedly. An incision was made over the last five dorsal and first lumbar vertebrae; the muscles and fascia were dissected away and the spinous processes removed with bone forceps level with the laminae. The spinal canal was completely exposed between the eighth and eleventh dorsal vertebrae, and was found to contain only fibrous strands, the cord proper having entirely disappeared. The operation was performed eight months after receipt of the injury.

The second patient was a male of thirty-five who had complete flaccid paralysis of both legs, loss of reflexes, and a bed sore in the lumbar region. About a week after the injury an incision was made from the tenth dorsal to the third lumbar vertebra and the spinal canal exposed. The cord was found crushed at the level of the lower edge of the tenth dorsal vertebra. Six months later the patient showed marked improvement.

In Willien's case a man was "squeezed" in a mine accident, sustaining fracture of the twelfth dorsal and first lumbar vertebrae, also several ribs, and one leg. He complained of no pain; temperature 100° F., respirations 22 and labored. There was a slight depression at the twelfth dorsal and first lumbar vertebrae, with curvature of the process to the right. Reflexes practically all absent; sensation from waist downward negative; voluntary and involuntary motion absent; there was bladder stasis; catheterization and enemata necessary. The x-ray confirmed the diagnosis of vertebral fracture. The patient's condition made laminectomy inadvisable until eighteen days after the injury. Meanwhile the leg fracture was reduced without pain.

The usual operation was performed and the twelfth and first lumbar spinous processes removed. Laminae of the twelfth and first vertebrae were also removed to release pressure on the cord. The dura had been punctured by bony spicules and fluid escaped; the bodies of the twelfth dorsal and first lumbar vertebrae were also punctured; all fractured particles were removed; the wound was closed and drainage instituted. The patient made an uneventful recovery.

Murphy speaks of a man of thirty-five who fell a distance of twelve feet, striking on his buttocks, followed by pain in his back and lower extremities. His physician noted a prominence of the last dorsal and first lumbar vertebrae, with considerable ecchymosis. There was no paralysis, but loss of sensation over buttocks, perineum, scrotum, and back of thighs as far as knee; no loss of sensation in

front of thighs; no girdle pain, and no annular paralysis. Since accident, catheterization necessary thrice daily. For first four or five days patient had great difficulty in defecation; since then involuntary evacuations. Examination revealed prominence of eleventh and twelfth dorsal and first lumbar spines. No paralysis of thigh muscles, but calf muscles flabby. Tactile sensation absent over glutei and diminished on back of thighs. Superficial reflexes present; left knee-jerk exaggerated; right slow and scarcely perceptible.

Operation disclosed pronounced forward luxation of first lumbar vertebra; angulation was so sharp and cord depressed to such extent that it seemed strange complete paralysis did not result. The spinous processes and laminae were removed from first lumbar vertebra, so cord was perfectly free behind zone of compression. The muscles were sutured with catgut across spinal column, and outside this the lumbar fascia, making an accurate apposition. The dura was not opened. Patient left hospital within five weeks, wearing leather jacket; two months later he had regained complete control of sphincters and muscle power except "he could not raise himself on his toes." Five months after operation he had entirely recovered.

In Hartwell's series of cases (one hundred and thirty-three), already mentioned, forty patients were subjected to operation. In thirty-eight laminectomy was performed, and in two an attempt was made to remove the deformity by manipulations. Secondary hemorrhages were infrequent and rarely sufficient to account for compression symptoms. The results of the expectant plan of treatment equalled those obtained by operative methods, and he says the results of laminectomy in this series do not justify an argument in favor of the operation, but rather serve as a warning against radical surgical treatment. Based upon his experience the author believes laminectomy is absolutely contraindicated:

(1) In patients in shock, or who have received demonstrable injuries in addition to the spinal fracture and the cord damage accompanying it:

(2) In patients with fracture of the cervical spine whose respiration is embarrassed by paralysis of the intercostal muscles:

(3) In patients whose paralysis accompanied or was noted immediately after the accident:

(4) Before the fourth day of convalescence, because in cases in which improvement occurs it cannot be expected to manifest itself before the fourth day:

(5) In all patients who are improving under con-

servative treatment, and laminectomy cannot be expected to better conditions if improvement once shown comes to a standstill:

(6) In patients whose vertebral fracture is unaccompanied by medullary symptoms:

(7) In all patients with uncomplicated vertebral fracture with accompanying cord injury until at least four days have passed—the minimum time for spontaneous improvement to manifest itself.

The author agrees that laminectomy is indicated in the rare cases of gradual onset of medullary symptoms, and in patients who originally free from cord symptoms begin to develop manifestations referable thereto.

Personal observation: Six weeks ago, in the mountain region of Kentucky, a girl of seventeen fell on the ice and slid down the mountain side probably one hundred and fifty yards.* She was rendered unconscious by the fall and when found a few hours later both her feet were frozen. She was taken home and a physician called, who found and properly dressed a scalp wound, but made no further physical examination.

A few days later another physician was called, mainly because it was noted the girl was unable to move her lower extremities and did not urinate normally, there being almost a constant "dribbling" of urine. Upon investigation this physician discovered that the girl had sustained fracture of the spinal column and also several ribs, and advised that she be taken where an x-ray examination could be made to determine the character and extent of the injury and what could be done looking toward relief. This explains the delay in the institution of treatment.

The patient was brought to Louisville March 15th, 1918, and a careful radiographic examination was made by Dr. D. Y. Keith, which demonstrated a crushing fracture of the eighth dorsal vertebra, but not interference with the alignment of the discs. There was also some evidence of damage to the seventh and ninth dorsal. The disc of the eighth dorsal vertebra was badly crushed and the spinous process bulged outward, giving the characteristic appearance of an old angulation from Pott's disease.

The girl's condition, both physically and mentally, was desperate. There was complete paralysis from the injured area downward, with loss of rectal and vesical sphincteric control. All the reflexes were practically abolished. Vesical infection had supervened and the urine which constantly "dribbled"

away was very offensive and had the appearance of thick green-pea soup. Her mental condition was one of utter despondency and depression; she was terribly emaciated, anorexia having been marked since receipt of the injury. Her pulse was about 130, temperature 101° F. She had no bed sores, but there were a few denuded areas on both feet where the skin had sloughed because of the frost bites.

The only sensory reflex we were able to elicit was in the genito-crural nerve area; pin pressure along the lower loin and inside the thighs caused slight twitching of the skin about the pubes. Further downward on the leg no reflexes were shown. Occasionally I was able to locate on the sole of each foot a small area where deep pin pressure caused slight jerking of the leg, but there was absolutely no sensation in those areas. The physician who accompanied the patient said he had tried faithfully, but had never been able to elicit this phenomenon. On the way to Louisville the voluntary micturition occurred for the first time since the accident—this was probably due to shaking of the train rather than to an over-distended bladder.

After making a thorough physical examination and studying the radiographic plates, I informed the physician and the family that in my opinion the condition of the girl was so extreme that she would soon die, and that no benefit could be positively promised from any method of treatment, though there was a faint hope that laminectomy with relief of pressure upon the spinal cord might be of some benefit. The patient might die on the operating table; but a fatal termination was inevitable unless radical operation was performed. They agreed to take the risk, and a laminectomy was performed March 20th.

I might mention that during the four days' preparation for the operation, the bladder was irrigated twice daily with boric acid solution, and once daily a twenty-five per cent. argyrol solution was injected. Under this treatment the urine became almost entirely clear, showing decided improvement in the bladder infection; the patient appeared to feel better and occasionally indicated a desire for food.

In performing the laminectomy a straight incision was made directly over the spinous processes and the bone removed over a sufficient area to expose about six inches of the spinal cord. It was demonstrated that the cord was not lacerated excepting at one point immediately underneath the eighth dorsal spine, but there was evidently considerable pressure because of the angulation present. Whether

*7. Read before the Society, before a meeting of the Society of Surgeons and Physicians of Louisville, Kentucky, March 21st, 1918.

a fragment of the fractured bone was driven through the dura at the time of the accident, or whether it was torn during my manipulation, is now uncertain; but I am inclined to think a bony fragment penetrated the dura; at any rate, a small quantity of clear spinal fluid escaped. Excepting for considerable distension below the damaged area there was no other apparent injury to the dura. The dural opening was closed with fine catgut sutures, and strange to say, there was very little hemorrhage. This is the only laminectomy I have ever seen performed where hemorrhage was not profuse. The external wound was closed in layers without drainage and a plaster dressing applied. When the patient was returned to bed her pulse was 120, and she was in no worse condition than when placed upon the operating table.

She passed a very comfortable day after the operation, her pulse remaining about 120, temperature 100° F. Her temperature during the night rose to 101° F., and she vomited a great deal during the afternoon. This afternoon she is feeling much better and more inclined to conversation; she answered questions promptly, smiled occasionally, and requested food several times; she was able to ask for what she wanted to eat, and seemed greatly pleased when they gave her some ice cream. She shows much more mental activity than at any time since the accident. This evening the mother told me that the child's legs had been twitching and jerking considerably. The patient herself says she first felt a "wavy sensation" in the soles of her feet, and since then a more or less constant burning feeling has been noted in the feet and legs. Her feet are now responsive to the pin pressure test, the least touch of the pin causing muscular contraction of the leg.

Of course, it is too early yet to do any prognosticating, and I have refrained from making any promises for permanent improvement. The patient's pulse tonight is 120, temperature 100° F. The nurse telephoned me late this evening that the girl had vomited violently and ejected a large round worm. It has been my experience that the majority of the Kentucky mountain people have round worms, and since she has gotten rid of this one I believe she will have less nausea and vomiting.

What the final outcome will be no one can tell, but I believe it was right to give the patient the benefit of the only chance for permanent recovery, i. e., by undertaking radical operation.

NOTE—Later report, April 13th, 1918 :

The patient mentioned in the foregoing report has continued to improve. Her pulse is now nor-

mal; occasionally slight elevation of temperature is noted. She is eating and sleeping well, and is able to lie on her back, which she could not do previously. Her mentality is much improved, she is quite cheerful; movement of the legs from pin pressure test has markedly increased; at one time she was observed to cross her legs, which is regarded as a favorable sign. Unless some unforeseen accident occurs the outlook for complete recovery seems good.

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URETHRAL CALCULI.*

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No discussion of urethral calculi would be complete without brief historical reference to urolithiasis in general. That concretions formed within the urogenital tract of living human beings, and were occasionally expelled spontaneously *per vias naturales*, was known to ancient medical writers. An excellent and precise description of renal and urocytic symptoms induced by calculi is accredited to Hippocrates; numerous presumed urolytic agents were recommended by Pliny; and Celsus is said to have suggested the first method for successful extraction of calculi from the bladder.

So far as can be ascertained nothing appears to have been definitely understood concerning the chemical composition of calculi until after 1700 A. D., although speculative deductions led Paracelsus centuries previously to conclude the basic formative element was "tartar." "The tartar is deposited from wine upon the sides and bottom of the cask." In his opinion "tartar" was the origin of most diseases, and that it differed in its qualities according to the nature of the liquid from which it was separated. He gave it the name of tartar "because it burns the patient like hell-fire (tartarus) in severe diseases.

*It will be noted that the term "urethral" in connection with uroliths is accorded the broadest interpretation, i. e., it is made to include all concretions resident within the urethral lumen or diverticula associated therewith, regardless of their original formative situs. It is recognized that from the standpoint of technical accuracy the word urethral should be applied only to calculi originating within the urethral lumen. The superscription limits the scope of this dissertation to urethral calculi, and the privilege of discussing the prostatic and bladder varieties is reserved for a future contribution.

It is deposited when the archeus acts with too much impetuosity and irregularity, and when it separates the nutritive principle with too much activity. Then the saline spirit unites with the earthy principle, which always exists in the liquids, but in the state of *materia prima*; and this union occasions the formation of tartar or calculus."

From that remote period until the present calculi have been the subject of constant scientific study and investigation. The component elements of the various types of calculi have been isolated by chemical analysis and microscopic examination, and lucid descriptions of their intricate formations are contained in current urologic text books. MacCallum states "concretions of crystalline material, mixed usually with some organic substance, and found at any point from the renal papillæ and renal pelvis to the urethra, constitute the group of urinary calculi." According to anatomic situation they have opportunity of assuming various forms; e. g., an irregular mass from the renal pelvis upon reaching the bladder is likely to become round by continuous application of new crystalline layers. Calculi vary in chemical composition and appearance, depending partly upon the situation in which they are formed, but chiefly upon the chemical character of the urine. Since the urine may frequently change in character during months or years while the calculus is developing, the terminal result may show laminæ quite different in color, consistency, and chemical composition (MacCallum).

Beyond the fact that calculi are necessarily urogenetic in origin, practically nothing is yet known of the primary etiologic factors concerned in their production, nor is it possible to demonstrate the exact *modus operandi* of their inception. The original formative situs is likewise uncertain, i. e., whether calculi discovered (at operation, necropsy, or otherwise) within the renal calyces or pelves, the ureters, the bladder, or the urethral lumen, developed primarily and remained in those anatomic situations, or whether they originated elsewhere within the urogenital tract and migration then occurred, remains an unsolved physio-pathologic problem. Obviously the migratory theory presupposes that calculi originating within the renal tubular lumina may later become pelvic, ureteral, cystic, or urethral; and if small may be then extruded through the meatus urinarius externus without the production of indicative symptoms. Doubtless this sequence of events quite frequently happens.

While it may be insusceptible of actual demonstration, the hypothesis appears reasonable that the majority of calculi originate within the lumina of

the *tubuli renales*, and thence migrate or gravitate to the other anatomic situations mentioned. Of course, this theory is inapplicable to urinary concretions which form around foreign bodies intentionally or accidentally introduced into the urethral lumen or the urocytic cavity.

It is admitted by MacCallum and others that calculi may form in normal non-albuminous urine, and may assume considerable size without causing symptoms; but because of their angular form they usually wound the renal pelvic or bladder mucosa, with the production of hemorrhage and inflammation which in turn are likely to change the reaction of the urine and initiate the deposition of layers of material of a character different from the original concretion. "When the calculus causes obstruction and bacteria are introduced, this change in reaction and the deposit of phosphates are inevitable." Kaufman contends that all urethral calculi composed of uric acid, urates, oxalate of lime, and cystin, are of secondary urethral origin; on the other hand, Lieblein has seen a primary urethral calculus composed of uric acid.

Kleinschmidt (cited by MacCallum) classifies calculi as non-inflammatory and inflammatory, and states that in each group there are primary and secondary formations representing stages of development similar to successive strata noted in geological formations. Several urinary crystalline substances, however, may form concretions without appreciable admixture, the chemical composition of the calculi being identical from center to periphery, e. g., uric acid, calcium oxalate, xanthin, cystin, calcium phosphate, etc. Some of them may become quite large, as do the mixed calculi; others form nuclei upon which, with a change in the character of the urine, successive layers of others substances are deposited. Diverticular calculi may attain enormous proportions; one mentioned by Bourdillat weighed 1,450 grams. In the absence of inflammation secondary calculi may be formed upon uric acid nuclei with layers of uric acid, urates, oxalates, calcium phosphate, etc. Likewise a calcium oxalate nucleus may later become a secondary calculus by being enveloped in layers of uric acid or calcium phosphate. "When bacterial infection and an inflammatory process supervene, phosphates, especially the ammonio-magnesium phosphate, sometimes with calcium carbonate, etc., make their appearance as strata of white, rather crumbly crystals, on the surface of one of these nuclei, just as they form an incrustation over any foreign body in the bladder. Indeed, they may form the whole calculus by them-

selves, without any obvious non-inflammatory stone or foreign body as a nucleus." (MacCallum.)

Much nomenclatural confusion has hitherto existed in the descriptive classification of urethral calculi, and there is yet no consensus of scientific opinion. It has been the general custom to classify as "urethral" all calculi resident within the urethral lumen without reference to their original site of formation. Lieblein, Kaufman and others contend that the designation "urethral" calculi should be restricted to those which form primarily within the urethral lumen, or which become augmented by deposition of new material after reaching the urethra. From a strictly technical standpoint this observation is undoubtedly correct.

Suter proposed the following system of nomenclature: "All calculi occurring in the urethra are to be designated as urethral calculi, whether primary or not. The term indicates where the calculus is found, without reference to its origin. To indicate its origin we may employ modifying terms, indicating whether the stone arises within the urethra itself, or wholly, or in part, outside. The terms proposed are: (a) autochthonous, (b) heterochthonous, and (c) amphichthonous. Autochthonous urethral calculi are formed in the urethra; heterochthonous urethral calculi are formed wholly outside the urethra; amphichthonous urethral calculi have their origin outside the urethra, but increase in size, by the deposition of new layers, after reaching the urethra." (Fowler.)

Some authors claim calculi never develop primarily within the urethral lumen. Legeu believes in every instance the calculus is renal or urocytic in origin and only secondarily becomes urethral. Grafe, however, considers all calculi remaining within the urethral lumen for any length of time formed there primarily.

Stevens admits that obviously primary urethral calculi are less commonly observed than the secondary type, and that primary formations depend upon certain abnormal conditions, such as strictures, congenital or acquired dilatations, diverticula, and prostatic hypertrophy; trauma also offers a favorable focus for the formation of concretions; likewise the composition of the urine is an important etiologic factor; concentrated urine rich in urinary salts, especially with ammoniacal decomposition, provides a favorable medium for calculus formations. "Deposits of such pathologic urine, especially if located at a point in the urethral wall which is changed in its configuration, will sooner or later become the nucleus." (Stevens.)

In nearly one-third of the reported examples, multiple concretions were noted. Thus, in Grobe's case 183 were extracted; Karajew removed 85 from a sac behind the prostate, and during convalescence 415 more were spontaneously extruded; Silthorpe removed 80 calculi from a urethral pouch behind a stricture in the scrotal portion. Multiple urethral calculi are sometimes faciculated, the most common variety being lozenge-shaped, the flat surfaces of the individual discs articulating with one another.

English reviews four hundred and five cases of calculi impacted in the urethral lumen or in diverticula. Five patients were less than one year old; twenty-three under two years; ninety-two under ten; thirty-five between ten and fifteen; twenty-two between sixteen and twenty; forty-one between twenty and thirty; thirty-nine between thirty and forty; age not mentioned in the remainder. The sites were as follows: membranous urethra, 42 per cent.; penile urethra, 58 per cent.; distributed thus: navicular fossa, 11.2 per cent.; pendulous portion, 14.5 per cent.; scrotal portion, 13.7 per cent.; and bulbous portion, 18.6 per cent.

According to Fowler, the largest urethral calculus mentioned in the literature is one recorded by Fisher which weighed "nineteen and one-half ounces." It was limited to the anterior urethra. The calculus in Kurbatow's case weighed 390 grams, and in Rorig's 250 grams. Kapsammer removed a calculus weighing 162 grams from a sac between the prostate and rectum. Naguera mentions a urethral calculus weighing 130 grams and measuring 14 cm. by 8 cm., which was passed spontaneously through a fistula (Fowler).

(To be continued)

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American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK OCTOBER, 1918.

VENTRICULOGRAPHY.

A novel method of diagnostic procedure has recently been introduced which bids fair to develop into big possibilities. The method is introduced by Walter E. Dandy of Johns Hopkins Hospital in an article entitled, "Ventriculography Following the Injection of Air Into the Cerebral Ventricles" (*Annals of Surgery*, July, 1918). As Dandy says, x-ray has proven of little value in the diagnosis of brain tumors; in Dr. Halsted's clinic only six per cent. of brain tumors cast a shadow, and in these the tumor was in part calcified. Practically x-ray diagnosis of brain tumors is restricted to cases where the skull is involved; and inasmuch as such involvement occurs nearly always in the later stages of the malady, when the condition is easily diagnosticable by other methods, x-ray diagnosis of brain tumors may be said to have hitherto been very nearly useless. Dandy conceived the idea of filling the ventricle with a substance that would cast a shadow in the radiogram. Since most neoplasms directly or indirectly modify the shape of the ventricles, Dandy believed that a change in size and shape of the ventricle would furnish an accurate aid in the localization of intracranial affections. Such a substance must obviously be non-toxic and readily absorbed. After numerous animal experiments, in which various substances were employed, always with fatal re-

sults, Dandy concluded that ventriculography could only be possible by substituting a gas for cerebrospinal fluid. The sharpness of gas bubbles in the ordinary plate led Dandy to try the injection of ordinary air. The merits of other gases are being considered. Dandy has devised a technic whereby as much cerebrospinal fluid as can be obtained is aspirated from the ventricle and replaced by an equal quantity of air.

A Record syringe with a two-way valve attachment is introduced either into the anterior or posterior horns; in young children this can be done by way of fontanelles; when these openings are closed it is necessary to make a small opening into the bone. Dandy submits the proper positions in which the head must be placed, in order that the maximum amount of fluid may be obtained in puncture of either anterior or posterior ventricles. In order that the brain shall not be injured by causing too great a negative pressure, the air is injected as the fluid is being withdrawn. Thus far, Dandy has injected air into the lateral ventricles twenty times; only once was there any reaction; this occurred 48 hours after the first stage of an operation for cerebellar tumor. All the injections were made in children between six months and twelve years of age. The radiogram may be taken either from the lateral or the antero-posterior position. The illustrations that accompany Dandy's paper are striking and show the ventricles outlined more clearly than we deemed possible. Thus far, Dandy has not yet obtained what he considered a normal ventriculogram, because the procedure was only attempted in abnormal cases. But one thing Dandy has already determined, and that is, that he has been able to diagnosticate a beginning internal hydrocephalus long before our present available methods of diagnosis enable us to do. The method has not yet been attempted upon adults, but Dandy anticipates several diagnostic possibilities. "1. The enlarged ventricles in internal hydrocephalus should be absolutely defined. 2. Tumors in either cerebral hemisphere may dislocate or compress the ventricle and in this way localize the neoplasm. 3. Tumors growing into the ventricles may show a corresponding defect in the ventricular shadow. 4. A unilateral hydrocephalus may be demonstrable if the air cannot be made to enter the opposite ventricle."

Any method that helps us in one of the least satisfactory fields of surgery is always welcome. Dandy's method sounds as reasonable as it is novel and further investigations are awaited with interest.—E. M.

BLOOD SUBSTITUTES FOR TRANSFUSION

It is common knowledge among military medical men that during active operations at the front, the Casualty Clearing Stations become crowded with wounded, the largest part of whom are actively suffering from the effects of hemorrhage. In a large percentage of those that die, the fatality is directly due to the acute anemia. The probabilities are very strong that almost all of the latter could be saved by the transfusion of blood.

Granted that all other conditions could be adequately and promptly met, it is manifest that the large amounts of human blood necessary for the hosts of wounded can not be available behind the lines, even if it were feasible to store human blood rendered incoagulable by the use of citrate solution. A great need has therefore arisen for artificial solutions which can take the place of blood.

It has been shown in animal experiments that it is important to maintain the blood bulk; and provided it remains within relatively normal limits, the amount of hemoglobin may be reduced to one-fourth of its normal amount without any resultant permanent ill effect. A further reduction of the hemoglobin results fatally. It seems from the experimental work reported that salt solution is the poorest substitute. The best results have been obtained with Bayliss' seven per cent. acacia solution; in less urgent cases a two or three per cent. solution answers the purpose. Hogan's solution—a 2.5 per cent. solution of gelatine has also given good results. The latter two, however, leave the circulation rapidly; and in order to obtain a permanent improvement it is necessary to employ solutions of a strength equal to that of Bayliss' solution.

The practical point to be gleaned from these facts is that each Casualty Clearing Station should be provided with sufficient amounts of these blood substitutes and with sufficient facilities for administering them to large numbers of men quickly. In a minimum number of the wounded, transfusions of small amounts of blood will be necessary in addition to the blood substitutes, but the amount of blood needed will be relatively small and should be easily obtainable behind the lines.—A. O. W.

PATRIOTISM WITHOUT HESITATION.

If our soldier boys deliberated as long over doing their duty as some of our people at home hesitate over doing theirs, the victory would be doubtful.

It is a sort of financial cowardice to hesitate to put your money in United States Government securities.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

SOME CAUSES OF INDUSTRIAL ACCIDENTS.

The investigation of industrial accidents continues to be a part of specific war work. The British Health of Munition Workers Committee has made a specific investigation of the causative factors of industrial accidents, and our own Bureau of Labor Statistics is soon to present some of its compilations, based upon recent studies. (Monthly Labor Review, August, 1918.)

Some of the findings of the British Committee are of particular interest; for instance, the number of accidents to women were $2\frac{1}{2}$ times as numerous when they were working a 12-hour day as compared with a subsequent period during which they worked 10 hours per day. It is patent that fatigue probably plays a marked part in this incidence of all accidents, and indicates the practical importance of a shorter work-day for women in industry.

The evidence with reference to the effects of alcoholic consumption was largely indirect, but the conclusion is reached that the influence of alcoholic consumption is manifest more in the night shift than in the day. This probably represents the opportunity for drinking in the day time, the results of which are carried over into the night. Experience tends to show that under methods of discipline the accident rates and the per capita use of alcoholic drinks decline more rapidly for the night than for the day shift.

"Accidents due to foreign bodies in the eye were 7 to 27 per cent. more numerous in the night shift than in the day shift, though all other accidents were considerably less numerous. This was due to the artificial lighting, as the excess of eye accidents was most marked in the worst lit factory." When every effort is being made to speed up industrial processes, the night shift should have every opportunity of working under as nearly daylight conditions as possible. The difficulties of artificial lighting are well known, but nevertheless, methods are now available whereby inadequate lighting may be practically abolished, and, with it, the types of injuries occurring in poorly lighted workshops tend to disappear.

Facts appear to be sufficiently numerous to justify the conviction that accidents increase in direct ratio to the temperature; the higher the temperature, the larger the number of accidents, although slow increases are also noted at temperatures lower

ture of 60° F. The importance of temperature and humidity regulation is obvious.

The report suggests that accidents are largely due to carelessness and inattention. While this may be true in a sense, it is probable that ignorance and inexperience are more largely the cause of accidents. Without minimizing the importance of personal care, it is more likely that the emphasis should be placed upon the development of adequate skill in various processes, particularly in those industries where accidents are prone to occur. The protection of machinery, the installation of safety devices of all kinds are not entirely sufficient to offset the hazards arising from the frequent turnover of labor, or the use of inexperienced employees at processes requiring special training and education.

Accident prevention is in part due to numerous psychical influences, but undoubtedly no psychical influence is of greater significance than that arising from a hazy or indefinite understanding of the work to be performed, the processes required, and the methods of attaining the specific goal set out by the employer, to whom the output is of maximum significance.

In the interests of material economy, and the safety of employee, preliminary training should be required of every employee so that an apprenticeship will give some measure of protection from the gross hazards which are preventable. The demand for labor of all kinds is so great that the rapid substitution of women for men in itself forms a new item in the causation of industrial accidents. Thus far, the industrial world has met the problem with a show of great interest, but there has not been complete recognition of the inherent difficulties in the readjustments of women to the industrial sphere. The prevention of accidents must begin with the installation of all safety appliances and devices on the one hand, and the instruction of the employee on the other hand.

The main factors influencing accident occurrence are those due to:

"Factors of personal origin—

- I. Nervous and muscular co-ordination in relation to speed of production.
- II. Fatigue.
- III. Physical influences.
- IV. Nutrition and alcohol consumption.

Factors of external origin—

- V. Lighting.
- VI. Temperature, humidity, and ventilation.
- VII. Defects of machinery and absence of guards."

The interpretation of these various factors involves a thorough understanding of the physical health of employees, their mental capabilities, their moral standards, their adaptability to new modes of employment, and the specific influences determining their entrance into the industrial field.

Education for occupation is a vital item in the prevention of industrial accidents, because where skill is lacking, carelessness, inattention, nervousness, and fatigue are likely to be found, leading possibly to undernutrition, or malnutrition, recourse to alcohol, and sundry other habits tending to undermine the industrial capacity. In other words, to the ordinary factors usually tabulated as causes of industrial accidents, one must add at this day one more of transcendent importance, namely, a lack of skilled training, or experience.

Book Reviews

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics, Materia Medica, and Diagnosis in the Jefferson Medical College, Philadelphia, etc. Assisted by LEIGHTON F. APFLEMAN, M.D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia, etc. *Volume I.* March, 1918. LEA & FEBIGER, Philadelphia and New York, 1918.

The résumé of medical and surgical progress and technic in this quarterly number of *Progressive Medicine* includes a most excellent section devoted to Surgery of the Head, Neck and Breast by Charles H. Fraser, a considerable portion of which discusses gun-shot wounds of the head.

Similarly, Mullar contributes a section on War Surgery of the Chest that is eminently satisfactory. The chapters on the Infectious Diseases are of particular interest, particularly because of the importance of these afflictions in connection with military efficiency. Brief paragraphs on Trench-fever, Trench-foot, and Trench-shin make the connection between disease and war more directly.

Other chapters are devoted to Diseases of Children, Floyd M. Crandall; Rhinology, Laryngology, and Otology by George M. Coats, which maintain the usual high standard characterizing *Progressive Medicine*. Military Otolaryngology receives considerable space in a very timely discussion.

Amputation Stumps: Their Care and After Treatment.

G. MARTIN HUGGINS, F.R.C.S., Medical Officer to the Government Schools, Rhodesia; late Surgical Specialist to the Pavilion Military Hospital, Brighton. London: HENRY FROWDE and HODDER & STOUGHTON, 1918.

Huggins' monograph is very timely and very valuable. He describes the various kinds of stumps which have resulted in the present war and pays special attention to the guillotine stump. The methods of secondary amputation in various parts of the upper and lower extremity are described in detail and with the object in view of rendering a good functional stump. The causes for failure, the causes for sinuses, sequestra and other delaying conditions are detailed and Huggins gives carefully detailed directions for avoiding these disappointments. On the whole, the monograph should find a place with every surgeon.

1917 Collected Papers of the Mayo Clinic, Rochester, Minn. Edited by MRS. M. H. MELLISH. Octavo of 866 pages, 331 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1918. Cloth, \$6.50 net.

This is the ninth annual volume of reprints of all of the scientific communications made by the various members of the staff of the Mayo Clinic. The volume includes all of the papers published in 1917. Many of the individual papers have been previously reviewed in numbers of the *AMERICAN JOURNAL OF SURGERY*. All of them are of interest to every medical man.

Diseases of the Male Urethra. By IRVIN S. KOLL, M.D., Professor of Genito-Urinary Diseases, Post-Graduate Medical School and Hospital, Chicago. Octavo of 151 pages, with 123 illustrations, several in colors. Philadelphia and London: W. B. SAUNDERS COMPANY, 1918. Cloth, \$3.00 net.

Koll's book is a comprehensive monograph covering the diseases of the male urethra. The conditions included are gonorrhea and all of its complications; non-gonorrheal urethritis; urethrorrhea, prostaticorrhea, and spermatorrhea; tumors of the urethra; verumontanitis and urticulitis; sexual impotence and sterility.

The subject matter is covered fully and is well and profusely illustrated. The operations for stricture—which owing to the new methods of treatment of gonorrhea are becoming less and less frequent—are described. Koll believes that for epididymo-orchitis or epididymitis most relief is afforded by combining the Belfield operation (vasotomy) with the Hagner operation (epididymotomy).

The volume should be of interest to all genito-urinary men.

The Treatment of War Wounds. By W. W. KEEN, M.D., LL.D., Emeritus Professor of Surgery, Jefferson Medical College, Philadelphia. Second edition, reset. 12mo, 276 pages, illustrated. Philadelphia and London: W. B. SAUNDERS COMPANY, 1918. Cloth, \$2.00 net.

This little volume was originally a report rendered to the Medical Committee of the National Research Council and advantage has been well taken of the need of a second edition to amplify its contents and bring the whole as near as possible to date.

The respects in which this war differs from all others—the huge numbers of men, the new weapons, and other means of warfare developed in this war—furnish the opening chapters. There follows complete descriptions of the new methods of treating war wounds: especial attention is paid to the Carrel-Dakin method and to the field for orthopedic surgery. Chapters are also devoted to tetanus, gas infections, and wounds of the various parts of the body.

A number of letters are appended from various leading surgeons abroad which emphasize the importance of certain principles described in the text. A chapter is contributed by Major McKenzie on the rehabilitation of crippled soldiers.

Sanitation for Medical Officers. EDWARD B. VEDDER, M.D., Lieut. Col., Medical Corps, U. S. A. Illustrated. LEA & FEBIGER, 1917.

This small work was planned to supply medical officers a useful guide for sanitary work. Sanitary orders and circulars are included to make the information official as far as possible. The section on transmissible diseases has been made to include the most recent knowledge concerning the etiology of each disease.

The section on camp, the march, the trenches and battlefield are full of valuable information; 25 pages are written on "insects concerned in the transmission of disease," and these contain many details on the detection and prevention of the diseases discussed.

There are dispersed through the book blank pages for notes and memorandums.

Cancer. Its Nature, Causes, Diagnosis and Treatment. By ROBERT HOLMES GREENE, A.M., M.D., F.A.C.S., Emeritus Professor of Surgery, Medical Department of Fordham University, Etc. JAMES T. DOUGHERTY, New York, 1918.

This little volume describes in a very simple and efficient manner the natural history of cancer as it manifests itself in human pathology. The topics covered are indicated in the title: "No attempt has been made to settle definitely many of the questions arising in connection with this wide-spread disease, but an effort has been made to show the lines along which future investigators probably must work."

Gas Gangrene. Its Bacteriology, Experimental Reproduction and Serotherapy. By M. WEINBERG, Chief of the Laboratory, and P. SEGUN, of the Pasteur Institute. Large octavo of 444 pages with 45 illustrations, and 16 plates. Paris: MASSON & Cie, 1918.

The perusal of this volume, a contribution from the Pasteur Institute, emphasizes anew the extraordinary efficiency with which the military medical men are overcoming the extraordinary problems presented by the great war. Gas gangrene was one of the most cruel surprises of the war for the surgeons, badly prepared for combating this scourge. The problem was set and competent men were found; the result is that gas gangrene has been put upon a sound pathological and bacteriological basis.

The monograph is a complete exposition. An exhaustive study of the bacteriology is described in all its minutiae and demonstrates the origin of the disease in fecal contamination from the human body or from the heavily manured fields of northeastern France. It is shown that the infection is most always due to a number of organisms, alike in some and differing in other respects, all marked with a seeming unity of purpose in that each is a potent helper to all of the others; and the symbiosis results in a maximum of effort for destructive purposes.

Weinberg and Seguin describe the clinical forms and the internal and external factors which favor the development of this infection. Quite a large chapter is devoted to the various sera which have been developed for use against the toxic manifestations of the disease. One is perhaps disappointed somewhat that no mention is made of the work of Bull and Pritchard of the Rockefeller Institute, and of the efficacy of their anti-toxic serum. Weinberg and Seguin have had good and bad results after the use of their sera. This phase of the subject is still somewhat experimental.

The monograph is very excellent and is a distinct contribution to medical science.

War Surgery of the Abdomen. By CUTHBERT WALLACE, C.M.G., F.R.C.S., Eng., M.B., B.S., Lond. Surgeon to St. Thomas' Hospital; Lecturer on Surgery in the Medical School; Consulting Surgeon British Armies in France. Octavo of 152 pages with 26 illustrations. Philadelphia: P. BLAKISTON'S SON & Co. 1918.

One of the difficult parts of war surgery is that pertaining to the abdomen. The diagnosis is seldom easy; the conditions under which the surgeon works are never of the best; the lesions are difficult to treat; the complications are varied and many. And yet results in the present war have, comparatively speaking, been better than in previous wars. All of this is directly due to the fixity of the fighting line which lends itself to the formation of facilities, customarily seen in civil life, and of which the most important is the speed with which the wounded are brought to the operating table.

On the whole Wallace has given us a fine contribution basing it on the experience of many surgeons and many operating centers and hospitals at one of the battle sectors. There is a fine chapter on the general considerations and this is followed by chapters devoted to the individual organs. The general scheme followed is to discuss the individual lesion, the other injuries with which it is commonly associated, and the approved methods of treatment.

The value of the book is further enhanced by numerous tables and diagrams.

Progress in Surgery

A Résumé of Recent Literature.

Why Are the Tonsils and Lymphatics of the Nose and Throat Responsible for So Many Systemic Diseases?

JOSEPH J. H. COSS, M.D., Chicago, *Chicago Medical Journal*, May, 1918.

Good epitomizes a few of the more recently demonstrated facts regarding the tonsils, their lymphatic distribution and their place in the introduction of infection into the body. He traces the experiments of Grobner in tracing out the passage of infection from the tonsils into the lymphatic system.

The tonsils are fully developed at birth and ready to perform their function—whatever that is. The crypts become filled with mucus, epithelial and food debris and bacteria. Jonathan Wright found that carmine granules blown against the tonsils were absorbed into the lymphatics while bacteria remained in the crypts. Good believes that this is a location of choice of the bacteria due to the rich food supply in the crypts. Their toxins are absorbed and slowly immunize the individual against infection. Good believes this to be the function of the tonsil.

Some Observations on the Decompression Operation on the Hypophysis by the Nasal Route.

OTTO J. STEIN, M.D., Chicago, *The Laryngoscope*, May, 1918.

In discussing decompression of the Sella Turcica for tumor of the pituitary body Stein enumerates the various methods of approach and submits as the route of choice the transphenoidal approach through the nose—the method employed by Oskar Hirsch of Vienna—submucous removal of the entire septum and to enter the sphenoid. As an anesthetic he uses morphine-hyoscine or scopolamine-morphine. He calls attention to the dangers of acidosis and cites a case that he lost in this way.

The diagnosis in these cases established by three cardinal symptoms, headache, loss or defects in vision and perverted pituitary physiological function. The diagnosis is confirmed by the x-ray finding. A good picture is of extreme importance to the surgeon, outlining as it does the variations in the position of the important neighboring structures and the thickness of the bony walls.

Another advantage of the submucous route is that the surgeon is at all times in the median line of the body and furthest away from optic nerve, carotid artery and cavernous sinus. Further, the author says asepsis is best maintained through this route.

Fractures of the Elbow.

JACOB GROSSMAN, New York City, *Interstate Medical Journal*, June, 1918.

1. Fracture of the elbow occurs commonly in children.
2. Males are more frequently affected than females.
3. Acute flexion is the best position for all fractures of the elbow except fractures of the olecranon process. These latter should be retained at almost complete extension.
4. Passive motion, massage and exercises should be given early. The tenth to the twelfth days are very good times to begin. Continue this treatment until the movements of the elbow are normal and free from pain.
5. Displacement of the fragments must be guarded against when passive movements are begun as faulty reduction causes periosteal proliferation that may lock the joint.
6. Fracture of the head and neck of the radius, while not a common condition, occurs often enough to be considered while making a diagnosis of injuries to the elbow.

The Treatment of Leg Ulcers.

P. G. SKILLERN, JR., Philadelphia, *New York Medical Journal*, June 15, 1918.

Sterilize the ulcer with 20% solution dichloramine-T dissolved in chlorocresane and leave the ulcer open, exposed to the air, keeping the bed clothes away with a cradle. Over the ulcer itself apply a wide meshed paraffin mosquito netting. The dichloramine-T is sprayed in a 5% solution

every 24 or 48 hours. As soon as the ulcer is sterile, as determined by the bacterial count, skin grafting is done. If the sterilized ulcer is small, it is best treated with calomel adhesive plaster. Most leg ulcers yield to these methods. If persistent, Skillern recommends the Nussbaum incision. This consists in making a circular incision two cms. from the margin of the ulcer. The circular incision is closed with fine horseshair sutures. In certain cases, dry hot air at temperatures of 250° to 300° is applied three times a week. When the ulcer is healed, the varicose veins are treated either by bandage or stocking, or by operation.

Sensitized Vaccines in the Prophylaxis and Treatment of Infections.

R. L. COTTELL, New York, *American Journal of Medical Sciences*, June, 1918.

It has been shown by numerous investigators that a vaccine sensitized with an homologous serum produces less local and constitutional disturbance when injected subcutaneously than does a non-sensitized vaccine. Even living virulent organisms when properly sensitized can be injected subcutaneously without serious consequences.

It has been maintained by some that sensitized bacteria, either living or dead, produce a more rapid and efficient immunity than non-sensitized bacteria do. This question, however, cannot be considered settled as yet.

Sensitized vaccines have been extensively used for prophylactic and therapeutic purposes.

The author has employed sensitized vaccines in a series of 47 cases, which include 20 cases of prophylactic vaccination against typhoid fever, and 27 cases of therapeutic vaccination against gonococcus, streptococcus, staphylococcus aureus and tuberculous infections. The sensitized typhoid vaccine produces a somewhat milder reaction than ordinary typhoid vaccine, and probably gives just as high an immunity. At the present time, however, the evidence for its superiority is not sufficient to justify the substitution of sensitized for ordinary vaccine in practice.

In the various infections treated with sensitized vaccines the results were, as a rule, no better than would have been expected with ordinary vaccine. It happened that in a few instances recovery followed the administration of sensitized vaccine after treatment with ordinary vaccine had failed. This may have been due to the fact that larger doses could be employed without untoward symptoms.

The chief objection to the general use of sensitized vaccines is the increased labor and time necessary for their preparation.

At the present time it would seem desirable to limit their use to the treatment of infections in which there is hypersensitiveness to ordinary vaccines or in which the latter have proved inefficacious.

Female Sterility.

T. C. STELWAGEN, M.D., and P. S. PELOUZE, M.D., Philadelphia, *Journal of the American Medical Association*, April 6, 1918.

While valuable work has been done on the bacterial flora of the female genitalia, little appears to have been done as regards the possible effects of such flora on procreation. The authors report a case of a woman who had been under the care of an eminent gynecologist for a year and a half, for the purpose of correcting an apparent sterility without effect, though her husband's seminal fluid contained countless numbers of very active spermatozoa. There was complete absence of vaginal discharge. The cultures taken from the vagina showed the usual flora with the predominance of diphtheroids, while those from the cervical canal were purely diphtheroids, showing almost all of the Westbrooke types of diphtheria bacillus, with many striking metachromatic forms. Autogenous vaccines were made and used on the husband and wife. This caused the disappearance of the diphtheroids. Three months later she found herself pregnant, and later gave birth to a healthy girl baby. Since this experience, they have had occasion to examine bacteriologically two cases of female sterility. In one of them diphtheroids were found in the cervical canal and in the other a study made for Dr. Alexander Randall, they predominated. Both patients are now under treatment with autogenous vaccines, but it is too early to report results. The authors hope that others will study similar cases.

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA & ANALGESIA

[American Journal of Anesthesia and Analgesia]

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October

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CAUSES OF FAILURE AND UNFOWARD RESULTS IN CONDUCTIVE ANESTHESIA.*

RICHARD H. RIETHMULLER, PH.D., D.D.S.

Professor of Oral Hygiene, New York College of Dentistry, New York City; Lecturer on Oral Hygiene, Long Island Medical College Hospital.

NEW YORK CITY.

(Concluded.)

Another source of pain during the insertion of the needle, which, it goes without saying, must be kept sharp, is scraping along the periosteum, which is extremely disagreeable to the patient. Picking up of the periosteum by the needle point which is extremely painful is avoided in the novocain safety needle illustrated in Figure 2 by the mark placed on the hexagonal hub in such a way that the operator is always able to determine whether the bevel of the needle, which gracefully slides over the periosteum without engaging it, is in the proper position, that is, the bevel of the needle pointing toward the bone, no matter how deeply the needle may be inserted in the tissues. Forcing the needle through muscular tissue causes a dull, yet pronounced enough pain. The infringement upon a nerve trunk is expressed by a very sharp, sudden and intense pain resembling the application of a cautery. As soon as any of these painful sensations arise, indicating that the needle is traveling on a wrong course, a slight withdrawal and subsequent alteration of the direction will immediately overcome resistance and start the needle on its painless way through areolar tissue, which causes the sensation of an advance into butter, while bone offers rigid, muscle and nerve tissue an elastic rubber-like resistance. The needle always must be manipulated during insertion in the manner of a slender probe enabling the operator's delicate sense of touch to determine at any stage what kind of tissue the needle is engaging. Operators who have for years practiced infiltration anesthesia exclusively are often in the habit of causing undue amount of pressure and jabbing, which is extremely disagreeable to the patient and dangerous.

INFILTRATION

While on the subject of infiltration, it should once more be pointed out that this method is superannuated. The undue pressure required in infiltra-

tion is liable to produce tissue lesions; the result in the lower jaw is disappointing; each tooth requires individual infiltration, opening up possible passages for infection; the periosteum may be ripped from the bone resulting in intense afterpain and possible necrosis; and most important of all the contents of a focus of infection hidden in the cancellated bone may be forced into deeper strata and the circulation and, revived by the ideal culture medium of Ringer solution, may act in the manner of an active bacterium leading to grave local and constitutional symptoms such as necrosis, osteomyelitis, cardiac disturbances, nausea, malaise and syncope. These risks are usually not present in infiltration on the palatine surface, where it is only necessary to infiltrate the soft tissues under pressure no greater than that required to keep the solution in contact with the tissues.

INFECTED AREAS

Areas which are not *bona fide* healthy are not suitable for injection. If a foramen can be reached by the extra-oral method, this method may be of great value if the patient will give his consent. As a rule, however, patients are laboring under the false impression generously fostered by the medical profession, that the interior of the mouth and its contents are the dentist's exclusive realm. All general infections of the mouth are an absolute contraindication to intra-oral injections. Pus carried by the needle to great depth may set up violent local and systemic intoxications and even prove fatal. Several such cases are on record.

FAULTY METHODS OF OPERATION.

Before proceeding to operate, the actual establishment of perfect anesthesia must be ascertained by pressure, or pricking or, if indicated, lancing with a suitable instrument within the area to be operated upon. If the slightest doubt exists as to the profundity of the anesthesia, comparison with corresponding non-anesthetized areas will give valuable indications. All anastomosing branches must be carefully considered, else the scalpel, curette, or bone forceps may suddenly invade an area in which sensibility persists. In mandibular injection the long buccal nerve, and in lower anterior teeth the anastomosis from the opposite side must be considered and, if necessary, abolished by an injection in the region of the molars or at the mental foramen of the opposite side respectively. The pain incident to prolonged retracting and stretching of the lips and muscles is combated by superficial injection under the mucous membrane of the cheek in the first molar region. In upper anterior teeth the anastomosis from the opposite side is abolished by a

* Read before the Joint Meeting of the Interstate Association of Dental Surgeons at the Massachusetts Valley Medical Association, Toledo, O., October 9-11, 1917; and also before the Annual Meeting of the Ohio State Dental Society, Cleveland, O., December 4, 1917.

transverse injection parallel to the masticating surfaces of the teeth half way between the gum-line and reflection of mucosa. The nasal branches are successfully anesthetized by the insertion of a small tampon saturated with 30 per cent. novocain solution upon the floor of the posterior nares. Neglect of these precautions may spoil the most beautiful surgical operation.

In the preparation of abutments or in the excavation of carious dentin the fact is often overlooked

operations. The manner in which the writer has seen some operators apply their forceps to a tooth or root is enough to frighten the patient forever, and the traumatism caused by speed fiends is not prone to inspire the patient's confidence in conductive anesthesia.

OTHER UNTOWARD RESULTS.

A certain amount of afterpain in many operations always will be unavoidable, as it is due to the traumatism caused by the operation itself and



Figs. 14-15. Left Anterior Palatine Injection. The anterior or incisive foramen is located in the median line back of the incisive papilla and emits the naso-palatine nerve, innervating the soft tissues palatally from canine to canine. The needle is inserted a short distance anteriorly to the incisive papilla, injecting under light pressure, advancing cautiously and slowly to a short distance posteriorly. Patient's head in reclining posture; mouth wide open. Quantity of solution 0.25 cc. or $\frac{1}{4}$ contents of syringe.

that the tooth, though anesthetized, is vital. Overheating or too close encroachment upon the pulp-chamber will lead to painful results and irreparable damage to the pulp. Oral surgeons, who have been used to operating under general anesthesia, had better re-learn how to operate. Speed is absolutely no virtue under conductive anesthesia, the duration of which for from one to three hours is absolutely insured and permits of slow, deliberate and beautiful

from which the tissues have to recover. Proper after-care, however, will successfully overcome this drawback. After thorough iodizing, wounds are dressed with novocain, anesthesin or orthoform powder in substance and tamponed lightly with iodoform gauze. If the edges of the wound are approximated by sutures, tamponing is out of the question, but the application of novocain in powder in bulk upon the fundus of the wound will en-

tirely prevent or greatly minimize postoperative pains. The frequent renewal of dressings is essential and, if the traumatic pain, despite all these measures, should be unbearable, the patient may be carried over the critical stage by injections of 1 per cent. novocain solutions, conductively. The result-

compress protected by a superimposed piece of flannel is employed to reduce inflammation. Violet ray high frequency current also is very soothing and stimulates healing. Internally pyramidon in 5 grain doses is administered to insure relief and a good night's rest.



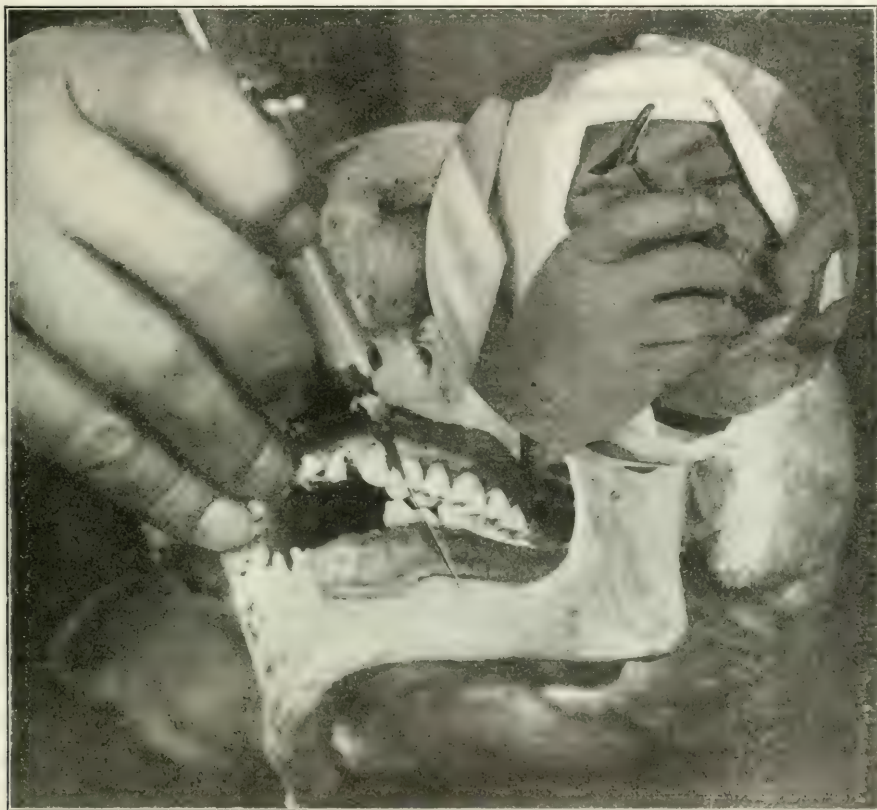
Figs. 16-17-18. Right Mandibular Injection. The mandibular foramen is located in the internal surface of the ascending ramus, giving entrance to the mandibular nerve into the mandibular canal, innervating the soft tissues facially, the bone and pulps of all teeth from the second molar to the third molar. Finding the foramen, if the thumb is placed on the ascending ramus, the index finger is desired, the mandibular or mental injection of the opposite side must supplement. The external oblique line is palpated in the mouth and the tip of the index finger held in the retromolar triangle. The needle is inserted at the mid-level of the nail of the palpating finger above the masticating surface of molars; in children and in old age somewhat lower, the barrel of the syringe resting on the bicuspid of the opposite side. The needle is advanced to full length before injecting. If the lingual nerve, innervating the soft tissues lingually is to be obtunded, 0.5 cc. or $\frac{1}{4}$ contents of syringe is discharged when the needle has entered the soft tissues halfway. When injecting on the right side the operator stands in front of the patient; when injecting on the left side, the operator stands on the right side, his arm placed around the patient's head, the left index finger palpating the external oblique line. The amount of solution which is readily acquired and offers easier access to and better visibility of the oral cavity. In either case the patient is seated erect, mouth wide open. Quantity of solution used 2 cc. or one full syringe.

ing anesthesia greatly heightens the comfort and speed of the healing process. As accessory treatment, ice-bags are applied for from ten to fifteen minutes, or the time-honored Prinsnitz cold-water

All other untoward painful results except those just mentioned are best overcome by prevention. Periostitis is avoided by avoiding injury of the periosteum. Pain or impaired function in muscle tis-

sue is caused by perforation of this tissue and deposition of solution within this tissue which acts much in the manner of a foreign body, the absorption of liquids within muscle tissue being extremely slow owing to its poor vascularity. Absorption is hastened by massage and electric stimulation. Edema

measures tending to stimulate absorption by heat and massage. Sometime an abnormal discoloration of the face is noted following infraorbital and tuberosity injections, especially in patients with flabby tissues. The face over the region injected becomes entirely white, color returning after a few minutes.



Figs. 19-20. Left Mental Foramen Injection. The mental foramen is located beneath and between the roots of the first and second bicusps, where the incisor branch of the mandibular nerve, innervating the bone and pulps of the first bicuspid (sometimes), canine and incisors, also the mental branch, innervating the skin of the chin, skin and mucous membrane of the lower lip, and anastomosing branches of the other side are blocked. Palpate foramen on face with the tip of the index finger, depressing lip with thumb. The needle is inserted in the reflection of the mucous membrane between the two bicusps and advanced, while injecting, almost vertically downward; since the foramen opens distally, until the discharging fluid is felt under palpating fingertip. Operator stands behind patient, who is erect, mouth half-open.

is due to overly rapid injections and, if present, should be immediately distributed by gentle massage. Piercing of a blood vessel following unduly rapid advancement of the needle brings about the extravasation of blood into the connective tissues. The resulting clinical symptoms are those of a bruise or black eye with tenderness and the gradual rainbow discoloration of the effused blood. The treatment is the same as that of black eye, all therapeutic

This rather unsightly symptom is no doubt due to the action of the suprarenin upon the veins or the direct introduction into a small vein. Gentle massage will hasten the return of color. Emphysema is due to the introduction of air-bubbles left in the syringe, and, while involving no danger, is extremely alarming to the patient and disfiguring. The patient's face is puffed and attempts at aspiration of the air embolus are usually futile, as the embolus

THE ANESTHETIST'S DAY'S WORK.*

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Acting-President American Association of Anesthetists.
PROVIDENCE, R. I.,

Surgical anesthesia is too frequently thought of as an absolute condition maintained by dropping ether regularly on a square of gauze or by manipulating the valves of a complicated apparatus.

The anesthetist's day's work is no such simple matter. It comprises the physical examination of the patient, a prognosis as to the chance for uncomplicated recovery, choice of the anesthetic best suited to the case, administration of the chosen agent according to the best technic, and noting the after-effect of the anesthetic until the dangers from postoperative complications have passed. Under present conditions the anesthetist must also find time for investigation and study.

THE ANESTHETIST'S TEXT-BOOK.

The composition and physical properties of the atmosphere, the principles governing vaporization, and the law of partial pressure of vapors and gases are included in the introduction to his text-book. Chapters follow on the mechanism of respiration, the respiratory changes in the air, the respiratory changes in the blood, the mechanism of the circulation, the effect of hemorrhage, of shock and of anesthetic drugs upon the respiratory and circulatory mechanism, the physical and chemical properties of the various anesthetics, and their physiological effect upon the normal or the diseased organism.

EXAMINATION.

The physical examination is made by the anesthetist himself, or under his direction, and preferably on a day preceding that of the operation. The subjective examination includes the questions of age, previous anesthesia, and symptoms of organic disease, especially cardiac, pulmonary or renal. The objective examination covers the heart, the lungs, the urine, in some cases the blood, and, of greatest importance, an estimation of the blood pressure. Information as to the nature and the probable duration of the operation is also required.

PROGNOSIS.

In deciding upon the chance for uncomplicated recovery, the factors to be considered are the age, the organic condition, the resistance,—as shown by the blood pressure index,—and the nature of the operation. Considering these factors, the anesthetist places each case in one of the following classes:

1. Good risk. Certain recovery.
2. Fair risk. Probable recovery.
3. Bad risk. Doubtful recovery.

He enters the prognosis in his record and, when it is unfavorable, notes the reason for this opinion. Evidently, with few exceptions, general anesthetics may be used for minor operations only among patients of class 1, and only for urgently necessary operations will they be administered to patients of class 3. Among the patients of class 2 some lives may be saved by careful attention to the preparation. The operation must sometimes be deferred for this purpose. Whether the prognosis is favorable or not, the anesthetist bends all his energy to securing one result—an uncomplicated recovery.

CHOICE OF ANESTHETIC.

Until the ideal anesthetic shall have been discovered, the choice will lie among the following agents: ether, given by one of several methods, nitrous oxid-oxygen, chloroform, and local anesthetic agents. The choice of the anesthetic depends, to some extent, upon the anesthetist's practice. If he is more skilled in the use of ether, this agent will be safer in the majority of cases. If he is accustomed to use nitrous oxid-oxygen, that anesthetic should more frequently be chosen. The nitrous oxid-oxygen enthusiast will find some cases for which ether is the safer anesthetic and the ether devotee will encounter instances where nitrous oxid-oxygen is the anesthetic of choice. Each will occasionally find that an intimate acquaintance with chloroform is indispensable to the most satisfactory work. *The anesthetist who is familiar with only one anesthetic agent must fail in some instances where another will succeed.*

ADMINISTRATION.

During the administration, the anesthetist has but three duties to perform:

1. To administer the anesthetic in the minimum amount required for the successful performance of the operation.
2. To maintain a free air way.
3. To note the condition of the patient.

MEASURED METHODS.

Continued scientific study of anesthesia will indicate that measured methods of administration must be generally adopted. As in the case of other potent drugs, the dosage of anesthetic agents may be stated within narrow limits. It is at least as important to know the usual dosage of the anesthetics as it is to know the customary dosage of strychnin or of morphin. To one who is familiar with a measured method of anesthesia, a change to an unmeasured method would mean a distinct de-

*Acting President's Address: Read during the Sixth Annual Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ill., June 10-11, 1918.

terioration in the character of his work and a halt in the progressive improvement in technic which is characteristic of measured methods. The theoretical and practical advantages of the measured methods are so evident that it is difficult for one to understand how any anesthetist delays in adopting them.

The dosage of ether may be expressed in liquid measure or in terms of vapor strength. In measuring liquid ether, it is important to remember that the specific gravity of the liquid is .716 and that a half-pound can contains 11.17 fluid ounces. The minimum anesthetic dosage of ether, learned from the study of intravenous and colonic etherization, is about 2 ounces for the first hour, including the amount used for the induction. To neglect to include the latter amount when stating the dosage is, whether intentionally or not, certainly misleading.

In expressing the dosage of ether vapor, much misconception has resulted from lack of standardization of terms. The dosage has been noted as vapor tension, weight percentage, or volume percentage. So much confusion has followed the indiscriminate use of these three methods of expression that some otherwise excellent papers have, as a result, been rendered useless. Expressing ether dosage in terms of partial pressure or vapor tension is of the greatest value in technical discussion and computation. Practically, the method is faulty as there is no direct means for measuring vapor tension and the expression of dosage in terms of vapor tension is unlikely to result in a clear mental picture. If we represent vapor strength in percentage by weight, we must constantly consider the specific gravity of ether vapor and also of air and the result is not readily visualized. A representation of vapor strength by volume percentage gives a clear mental picture and is the method of choice.

While ether or chloroform vapor for anesthetic purposes is never used pure, but always in mixture with a large proportion of air, nitrous oxid-oxygen must be used in the pure condition unmixed with air. The dosage of nitrous oxid-oxygen is indicated in terms of volume percentage of the two gases or in terms of rate of flow of each gas per period of time.

The dosage of local anesthetic agents should be stated in weight of the drug employed as well as in volume per cent.

THE AIR WAY.

A free air way is of great importance in every form of an anesthesia. With ether or chloroform,

cyanosis is never allowable. The amount of the anesthetic necessary to produce anesthesia does not displace sufficient oxygen to result in cyanosis, and mechanical interference with respiration must always be discovered and relieved. The anesthetist must seek the cause, not only within the upper respiratory tract, but externally as well, as in the case of a tight bandage about the neck or an assistant resting on the chest of the patient. None of the inhalation anesthetics when well administered, in case the mucous membrane is healthy, produces any marked increase in the secretion of mucus. The excess of mucus seen in some cases of etherization is due simply to a great overdosage of the drug.

CONDITION OF PATIENT.

For noting the condition of the patient during operation, the sphygmograph is by far the most valuable means at our disposal. With routine 10-minute blood pressure tests intelligently interpreted, the anesthetist is in a position to appreciate the effects of hemorrhage or of shock and to predict with considerable exactness the space of time during which the operation may safely continue.

The anesthetist starts the administration sufficiently early to insure the necessary relaxation at the beginning of the operation, but not so soon as to subject the patient to an unnecessary duration of anesthesia. He notes the steps of the operation only as a guide for his own work. Seated on a low stool, with his work before him, the field of operation is not in his range and he is out of the line of vision of the operator. His duties and his presence may be forgotten by the surgeon except in case of emergency. As the operation nears its end, he lowers the anesthetic dosage so that recovery may commence as soon as possible after the operation is finished. If these conditions are not present, the situation is not greatly improved by placing a screen to hide the anesthetist from the surgeon and the surgeon from the anesthetist.

RECOVERY.

The test of good anesthesia is satisfactory recovery. Having labored assiduously to secure uncomplicated convalescence the anesthetist will certainly be sufficiently interested to follow the after-condition of the patient. In the consideration of postoperative complications and fatalities, the preoperative prognosis becomes of great value. In some cases, conditions entirely independent of the anesthesia will be encountered in the course of the operation which will necessitate a revision of the prognosis, but, in general, a death occurring among the cases in which the anesthetist has given a favor-

able prognosis should be completely investigated, to determine the influence of the anesthetic in producing the fatality. A series of deaths or of post-operative complications calls for a very thorough investigation. Misleading reports, comprising large series of cases where no death was immediately due to the anesthetic, but with many instances where investigation would have shown that the anesthetic had been a factor contributing to death or serious complications, should not pass unchallenged. Our tendency to forget our present failures must be overcome if we are to hope for greater success in the future.

A large proportion of nausea and vomiting following operation is due to overdosing with the anesthetic and disappears when a carefully measured dosage is adopted. Following a well administered ether anesthesia, 60 per cent of the patients will have no nausea or vomiting at any time. About 40 per cent vomit slightly, once or twice within an hour or two of the operation. Less than 1 per cent vomit to excess in a period varying from several hours to several days. Care is required in determining the proportion of nausea and vomiting following anesthesia. The advocates of each new method claim a reduction in nausea as one of its advantages. If all of these claims had been justified, at the present time all of the patients would recover from the anesthetic not only without nausea but with a prodigious appetite.

One may object that it is a lot of work to examine patients on the day before operation, to study measured methods, and to follow the after-conditions of the patients. Why need the anesthetist take so much extra trouble? The advantages gained are well worth the effort. The patients will have a more comfortable surgical experience and a better chance for uncomplicated recovery. Also, the anesthetist himself, who does better work today, can look forward to further improvement in the future.

I cannot close this address without consideration of our special duty today. Anesthetists are highly specialized, skilled in their own work, but frequently lacking in experience in general medicine and surgery. How may the members of this association, who are not already in service, best serve our country and the cause of freedom? The answer is clear. Those who are eligible should enlist in the Medical Reserve Corps. In this organization are great opportunities for service in every branch of medical work. Those who are ineligible, through age, physical disability, essential institutional or public work, or on account of their dependents,

for service in the Medical Reserve Corps, should enlist in the Volunteer Medical Service Corps. The service of the members of this corps will be rendered to existing governmental agencies upon the request of the Army, Navy, Public Health Service and American Red Cross, to fill certain needs not already covered, and such other service as may be determined by the Central Governing Board of the Volunteer Medical Service Corps.

In the present emergency, the anesthetist should seek for opportunities for improving his own day's work, for standardizing the methods of anesthesia, for giving instruction in medical schools, for improving anesthetic conditions in the civilian hospitals and for instructing those who are to administer anesthetics in the Army and Navy hospitals and at the front.

131 WATERMAN STREET.

INSTRUCTION IN THE PHARMACOLOGY OF ANESTHETICS.*

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CLEVELAND, OHIO.

Before the student is given the opportunity to acquire a practical experience in the administration of anesthetics to human patients, he should possess a rather thorough knowledge of their actions; that is, of their pharmacology.

This does not mean a mere memorization of indigested textbook details; but rather a personal grasp of the essentials of the subject. There is but one way of obtaining such a knowledge of any subject; namely, to take it apart and fit it together, to turn it inside out and outside in, until the mind can grasp it in every part and as a whole. This represents an ideal that cannot be realized in full even by the specialist; but it can be approached even by the student, under proper conditions.

It is important to this end that the student should have the opportunity to study the subject from several points of view, for this is essential to true perspective; and that he should have the opportunity to apprehend the subject with his senses, for this is essential to render it alive and personal.

Such a study involves the taking apart, the analysis of the actions of the anesthetics; their modifications by asphyxia, hemorrhage and sensory reflexes; the phenomena of fatalities; the possibilities of treatment. All these are matters that can be presented to the senses only by personal experi-

*Read during the Sixth Annual Meeting of the American Association of Anesthetists, Chicago, June 10-11, 1918. From the Pharmacologic Laboratory of the School of Medicine, Western Reserve University, Cleveland, O.

mentation, by practical work in the laboratory, including the use of animals, and employing the common methods and apparatus of pharmacologic experimentation.

The subjects can therefore be studied to the best advantage in the course of Experimental Pharmacology, or Pharmacodynamics. Indeed, a fairly thorough study of the subject of anesthetics is a necessary part of pharmacologic instruction. It would result in a considerable waste of time and effort to overlook these facts, and to plan a special course on anesthetics without reference to the instruction that a student should have obtained in Pharmacology.

Useful repetition of instruction must be purposive, and not haphazard. There is a very real need of a better correlation of instruction.

The details of the instruction should vary in different institutions, so as to utilize special qualifications and resources, and to encourage initiative. It is only essential that the principles be followed: that the instruction in Pharmacology should have the responsibility of giving the student a thorough knowledge of the fundamentals of anesthesia; and that the instruction in clinical anesthesia should be built on this basis. There should be a certain amount of dove-tailing. The instruction in Pharmacology should be planned with a view of its future practical application, and should therefore at least outline the problems of clinical anesthesia. The instruction in clinical anesthesia should involve the constant use, and therefore review, of the fundamental data.

The instruction in anesthetics, as it has been developed in the course of Pharmacology at Western Reserve, may serve as an illustration of these principles,—it being understood that it is merely an illustration, and not a fixed pattern.

It should be explained that this course is divided into two parts: The objective study in the laboratory is given in the latter part of the second medical years. In this introductory course, the subject is arranged according to the tissues and functions that may be affected by drugs. The work is, as far as possible objective, and as little as possible didactic. Nearly the entire instruction consists in demonstrations and individual laboratory work, with sufficient conferences to insure the understanding of the facts.

The work in the first half of the third medical year is entirely didactic, and takes up the individual drugs systematically. It is based on the laboratory work of the preceding course, but aims to be more systematic and more detailed, and to apply the pharmacologic data to the problems of

the clinic. It is along the usual lines of didactic instruction and scarcely needs further discussion.

The arrangement of the laboratory course, as already explained is not such as to take up anesthetics, once for all, and then drop them. On the contrary, they are studied on frequent occasions, and from different points of view, so that they are kept before the student almost continuously.

The course begins with CHEMICAL AND PHYSICAL WORK. This offers opportunity for presenting the basic theories of anesthesia, in connection with the study of Distribution of Coefficient, Competition of Solvents, etc. It also includes the changes that occur during the Evaporation of Anesthetic Mixtures.

The next line of investigation involving anesthetics occurs in connection with the general conception of depressants. This presents the SYMPTOMS OF NARCOSIS, as exhibited by frogs; including the comparison of various central anesthetics. These experiments prepare the student for the later experiments on mammals. They also permit observations on the reflex time; and the demonstration of the independence of narcosis from circulatory changes (by the "salted frog").

We then come to LOCAL ANESTHETICS, illustrating depression of localized nervous structures. The effects of various local anesthetics are studied and compared, on direct application to nerve-trunks, and on mucous membranes (frog's foot, rabbit's cornea, human tongue). Infiltration anesthesia may be demonstrated by the wheal-method. This also shows the influence of epinephrin. The ethyl chlorid spray is applied by the students.

It must be understood, in this as in all other experiments, that the individual students do not perform all the experiments. These are distributed among the class, so that each student covers the essential phenomena. The special features of the experiments are brought out in the semi-weekly CONFERENCES, where all the results of the class are presented and discussed.

The course next takes up various functions that are affected incidentally by anesthetics. This includes the direct effects of chloral on VESSELS (Perfusion of excised kidney, spleen, or intestine); and particularly the effects of the various anesthetics on the HEART; the relative toxicity as illustrated on the frog-heart; and the analysis of the cardiac effects by tracings from the intact and from the perfused hearts of frogs and turtles; the antagonism of epinephrin, etc. Here again the different students work with different methods or with different anesthetics, and the results are compared in the conferences.

The study of anesthetics is resumed on NORMAL, INTACT MAMMALS; observing the symptoms and toxicity, and their modifications by antagonists. This includes also the relative absorbability by stomach and rectum (chloral); effects on temperature (chloral, morphin, cocain); glycosuria (morphin); treatment of narcotic poisoning by caffeine, strychnin and heat; Magnesium anesthesia and calcium antagonism; trigeminal-vagus reflex of chloroform inhalation, etc.

A later exercise takes up the changes of RESPIRATION as effected by anesthetics; determinations of the respiratory volume and respiratory tracings, as modified by chloral, alcohol and morphin under various conditions; and their response to reflex irritation, camphor, caffeine, etc.

This preliminary work has prepared the class for an intensive study of the anesthetics as such, with special reference to the problems of clinical anesthesia. In this exercise, some of the group compare the onset, course and duration of anesthesia with different agents (nitrous oxid, chloroform, ether, ethyl chlorid, rectal ether) and the modifications introduced by the use of morphin or morphin-scopolamin.

Other groups take tracings of the respiration, and blood-pressure, under varying conditions,—such as simple, smooth ether or chloroform anesthesia, light and deep; effects of reflexes during different degrees of anesthesia; insufficient aeration; change from one anesthetic to another; also intravenous and insufflation ether anesthesia.

Anesthetic accidents occur naturally or are induced intentionally; such as simple excess of anesthetic; asphyxia; myocardial insufficiency (by phenol); cardiac dilatation (saline infusion), and cardiac failure (epinephrin). The various methods of resuscitation are applied and compared. The students are encouraged to vary the experiments so as to bring out as many phases of the anesthetic problem as possible.

Later experiments take up the effects on the mammalian circulation by more specialized methods, such as the vasomotor center by the perfusion-plan and cardioplethysmographic tracings.

DISCUSSION.

DR. E. M. SANDERS, Nashville, Tenn.:—Dr. Sollman's paper is of exceptional interest to all those who are teaching anesthesia, either in the laboratory or the clinic and I trust that we will all carry away with us many of the practical points he has made. Even a cursory review of the literature of anesthesia in recent years shows a surprising amount of attention being paid the subject by research-workers, while there has been a commendable disposition on the part of expert anesthetists to turn all valuable investigations to practical purposes. It should, however, be emphasized that the teaching of anesthesia, both in its pharmac-physio-pathological and clinical aspects admits of great extension and improvement.

DR. BEN MORGAN, Chicago, Ill.:—I can only reiterate Dr. Sander's remark on the poor showing we are still making in the teaching of anesthesia. While Dr. Sollman's schedule represents the basic principles with which each student should become familiar, it should also be pointed out that the student should not be misled by the effects on anesthetics on healthy animals, which may be considerably at variance with the effects on patients in a critical condition submitting to grueling operations. The problem is how to blend laboratory and clinical instruction so that the experimental work enhances clinical progress. It is my impression that this association could accomplish a good deal through the work of a special committee appointed to draft a course of basic laboratory and clinical instruction and attempt to have it adopted by the various medical schools as a standardized course in anesthesia.

DR. ISABELLA C. HERB, Chicago, Ill.:—There is no doubt that certain clinics and schools have the aptitude of putting their medical students and internes to the solution of vexed problems in anesthesia. I know that at Rush and in the Presbyterian Hospital we have had very encouraging results from the experimental and clinical work of the students, but we have always tried to direct this work of investigation along practical as well as scientific lines. Students and internes need only be impressed with the fact that anesthesia holds out opportunities to them to be interested in achieving efficiency both in its experimental and clinical phases. Schools or clinics that attach no importance to anesthesia should not expect any interest in the subject from their students or internes. The best incentive is to provide something to be striven for and attained.

DR. F. H. McMECHAN, Avon Lake, Ohio:—It is certainly a very peculiar situation in medical education to find some notable institutions in which excellent research-work in anesthesia is being done still using non-medical persons for the administration of anesthesia to patients. While non-medical persons may be made proficient in some one, routine method of surgical anesthesia, they lack the fundamental education and training to comprehend the advances in anesthesia and to apply them for the benefit of the public. These medical schools, also, are doing themselves and their students an injustice in that they are virtually closing the doors to a career in anesthesia to their students. The literature on anesthesia of the past fifteen years contains some three or five contributions from non-medical anesthetists. If progress in anesthesia were dependent on this source of research and clinical advancement, anesthesia would have long since died of dry rot. It is a good sign of the times, however, when the research-workers of the most noted medical schools not only interest themselves in anesthetic investigations, but extend our association the honor of coming before it and presenting their data and results.

THE SPECIALTY OF ANESTHESIA IS BEGINNING TO COME INTO ITS OWN. A NUMBER OF ASSOCIATIONS OF ANESTHETISTS HAVE BEEN ORGANIZED; AN OFFICIAL ORGAN HAS BEEN ESTABLISHED FOR THE PUBLICATION OF THEIR TRANSACTIONS AND A YEAR-BOOK HAS BEEN FOUNDED TO COLLATE AND PRESERVE ALL WORTH-WHILE RESEARCHES AND CLINICAL PROGRESS IN PERMANENT FORM. THE QUESTION NOW IS WHAT ARE YOU DOING TO MAKE THESE VITAL ADJUNCTS OF YOUR SPECIALTY A SUCCESS? ARE YOU BRINGING NEW MEMBERS INTO YOUR ASSOCIATIONS OF ANESTHETISTS? ARE YOU PREPARING PAPERS FOR THEIR PROGRESS? ARE YOU PURSUING ANY RESEARCHES IN THE SCIENCE OR ART OF ANESTHESIA? IF NOT WHY NOT? YOUR SPECIALTY NEEDS YOUR CO-OPERATION.

ANESTHESIA AT THE FRONT

Continuing the Department of Anesthesia at the Front, the Editor of the SCIENTIST presents additional data collated from authoritative sources that will be of interest to those reading a story of Anesthesia in War Surgery.

EXPERIENCES OF AN ANESTHETIST AT THE FRONT.*

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MONTREAL, CANADA.

In the autumn of 1914, the Governors of McGill University, Montreal, offered the Canadian Government a sufficient number of the staff of its Medical Faculty to provide officers for a military general hospital. On the 5th of March, 1915, the hospital, which was known as No. 3 General, commenced recruiting. The Commanding Officer was Colonel H. S. Birkett, dean of the Faculty of Medicine, who had served for many years in the Canadian Militia before the War. Among the officers were specialists in surgery, internal medicine, diseases of the eye, ear, nose and throat, an anesthetist and a neurologist.

We had among the noncommissioned officers and privates seventeen men who were given their degrees in medicine that Spring. We had also a number of medical students. I may say now that shortly after our arrival in England the graduates were taken from us and given commissions in the Royal Army Medical Corps. Later on the medical students of the 4th and 5th years were ordered to return to Canada to complete their medical education. A number of the men in the primary years managed to break away and join combatant units as officers. Two succeeded in getting into the Royal Navy as surgeon probationers. The public in Montreal were much interested in the hospital and subscribed liberally to the company fund.

We were given two motor ambulances and two four-seated Ford cars. The latter were found to be very useful for pleasure as well as business and many were the delightful trips we took in them before the supply of petrol was cut down and such excursions forbidden.

A Canadian lady living in the United States wrote to us saying that she had heard that anesthetics

were needed at the front and offered to buy us a supply. It was suggested to her that she should present a gas and oxygen apparatus. Her answer was that she had made inquiries and had been told that this could be bought for about twenty-five dollars and that she would like to give something which would cost more. When it was explained how much the real cost would be she at once sent a cheque for \$1,000,000. With this an Ohio Monovalve was bought and a plentiful supply of nitrous oxid and oxygen in both large and small cylinders.

We left Montreal on May 6th and arrived in England after a very uneventful voyage. Shortly after arriving in England most of our officers were sent to different military hospitals for instruction. I was sent with two others to Netley, near Southampton. When we reported for duty there the adjutant said to us with rather a weary air: "Well, gentlemen, I am delighted to see you, but I have no work for you and no quarters. You had better find billets in Southampton." So for three weeks we had nothing to do but amuse ourselves, which we did to some purpose, exploring the New Forest and making trips to London, the Isle of Wight, Salisbury, including Stonhenge, and other places.

We arrived in France on June 18th and after a short train journey were dumped down at a small country station near which were some British tent hospitals. Our camp ground was between two of these. The area assigned for officers' quarters was in a ploughed field and here we were soon at work putting up our tents. It was six weeks before we were ready to receive patients. During that time we were erecting the Indian Durbar tents supplied to us. These are huge marquées, some of them capable of accommodating 60 beds. They are made of cotton in several layers and really consist of one tent inside another. At the same time the operating room was built. This contained space for three tables. During such times as we were busy these were in use simultaneously all day long.

When the gas machine was ready for use it was one of the stock sights for distinguished visitors. Great were their wonder and admiration. As many of you know, the English apparatus for gas and oxygen is of a rather primitive type. So far as I know they have none which will supply a steady flow of gas at a uniform pressure. *We used our apparatus a great deal. It was especially useful in patients who were in very bad condition. Many of these cases were suffering from gas gangrene or other form of severe sepsis. It was also very useful in the wards for painful dressings, especially cases of compound fracture of the femur and gun-*

*Continued from the September Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ill., June 10-11, 1915.

shot wounds of the knee. We brought over with us the small carriage made for taking the apparatus about. It had the fault of not being strong enough. The carriage, however, had never been intended for use at night, over rough ground. Something in the nature of a wheelbarrow would have been more serviceable. *My experience with ether made me consider it distinctly less useful than in civil practice. English ether seems to be weaker than American. We, fortunately, brought a supply of Squibbs' ether and found it more satisfactory. A soldier, as a rule, takes a large amount of anesthetic. With open ether, especially in the hands of an inexperienced anesthetist, he is liable to use language which it is extremely unpleasant to hear in the presence of nursing sisters. Closed methods were found much more satisfactory when properly used, especially when commenced with nitrous oxid gas. A very satisfactory way is to precede ether with ethyl chlorid, using Loosely's Inhaler attached to Hewitt's wide-bore inhaler.* There is, of course, the trouble of washing the apparatus after each administration. This unfortunately had to be done often in a hurried and perfunctory manner. The anesthetist has to do this himself as the number of nursing sisters and orderlies in the operating room of a military hospital is strictly limited.

I used intratracheal ether frequently and found it very satisfactory. When I was short of assistants I would sometimes put the patient under ether, introduce the tube and leave the patient while I went on with another case. The pharyngoscope issued by the Government was two inches too long but I had it cut down and then it did very well. I know no instrument as satisfactory as Chevalier Jackson's. I had a fairly large experience with chloroform and found it on the whole the most satisfactory of all anesthetics. At first I used the Vernon Harcourt inhaler. The initial outlay is rather high as it costs twenty-five dollars but the saving in anesthetic is wonderful. I have frequently anesthetized patients for short operations with less than two drachms of chloroform. The chief defect of this method is its slowness as it takes sometimes eight or ten minutes to get the patient under. Recovery, however, was quick and very few patients afterwards complained of any unpleasant sensations. Vomiting was extremely rare. One of my assistants became ill with appendicitis and had to be operated on. I asked him what anesthetic he would like and he immediately said: "Chloroform, with the Vernon Harcourt Inhaler." He afterwards spoke in the highest terms of his experience.

Another defect of the Vernon Harcourt Inhaler

is that the rubber face piece rots very quickly from the solvent action of the chloroform. The latter impregnates the saliva and where the saliva reaches the face piece rotting soon commences. I also had very satisfactory results with chloroform given on an open mask. I never had a death, though one of my assistants, who had not had much experience in anesthesia, lost a patient. At No. 3 General after I left it there was a death under ether and another under nitrous oxid and oxygen, both apparently due to the anesthetic, but I have no very complete knowledge of the details.

In a certain number of cases I used ethyl chlorid alone for short operations with Loosely's Inhaler. I never found it as satisfactory a method as nitrous oxide and oxygen. It is, however, useful when the latter cannot be obtained and is much more portable.

There are in the Canadian Army Medical Corps in England and France not more than four or five specialists in anesthesia. The anesthetic is frequently given by the most recently joined officer, with results to the patient which it is not necessary in this company to specify. The more one sees of the real soldier the more one feels that nothing is too good for him. To increase his comfort and safety I would like to see private enterprise supply modern gas apparatus to all the Canadian hospitals. This cannot be expected from the Government on account of the expense. A specialist in anesthesia might be detailed to go from hospital to hospital to teach the proper method of using gas and oxygen and to make suggestions as to the organization of a proper anesthetic service in each hospital.

If the younger medical officers were kept on anesthetic duty continuously for three months and their work properly supervised, we would not have so many of the wounded dreading the anesthetic more than the operation.

Every expert anesthetist that this Society sends overseas means the saving of a certain number of soldiers' lives and the prevention of an immense amount of suffering and discomfort.

The bearing of the British soldier in the operating room is admirable. If he is a walking case he comes in his blue hospital suit, kicks off his heavy boots and jumps up on the table without a word. He does exactly what he is told, is wonderfully appreciative of anything that is done for him and is very uncomplaining.

As winter came on our Durbar tents were found to be unserviceable. There was a great deal of rain with high winds. The cotton became soaked and the tents were either blown down or torn. The muddy soil would not hold the tent pegs. Finally

on November 20th, we were notified that we were to close down and admit no more patients. We had then nothing to do but while away the time. This was not very easy to do. The officers' mess was in two marquées heated by braziers which filled the atmosphere with fumes which induced coughing and only warmed those who sat very near them. We slept in bell tents which were comfortable enough when a coal-oil stove was burning, so long as one did not have one's feet on the floor. To leave them there meant they soon became as cold as ice. The best way to be comfortable was to lie one one's bed.

During this time our Commanding Officer received an invitation to send some of his officers to Paris to attend a banquet given by the American Club of Paris. Permission was obtained and eight of us went in our two Ford cars. The journey which took a whole day each way, was very cold and much prolonged by numerous accidents to our tires which were old and worn out. However, it was well worth while as a change from the monotony of camp life. Early in December twelve of our officers, including myself, received orders to return to England for duty at Shorncliffe. Not long afterwards, having applied for a transfer, I was ordered to return to Canada to help in the recruiting and organization of the 9th Field Ambulance. Owing to delay in getting my movement order I arrived in Montreal only four days before the field ambulance left, so that I had two voyages across the Atlantic, both of them very stormy, within a month. On arrival in England about the middle of March, we went into camp at Bramshot. We had a certain amount of discomfort here as the weather was cold and we had to sleep in huts which were not heated or furnished in any way.

A field ambulance in the British Army is composed of three sections, A, B and C, each capable of acting independently. Each section is composed of a tent sub-division for operating and dressing station; a bearer sub-division for collecting wounded and a transport sub-division, the personnel of which is drawn from the Army Service Corps. Its function is to take over the wounded from the fighting units and transport them to some place where they can be taken over by a motor ambulance convoy which in its turn takes them to a Casualty Clearing Station. The total personnel is 10 officers, nine of whom are doctors, and 224 noncommissioned officers and men. There are three horse and seven motor ambulances, besides a good deal of other transport wagons of various kinds.

Our time in Bramshot was taken up pretty fully in completing our equipment, medical examinations, and route marches. Within a month of our arrival

in England we embarked at a port in the South of England. Here we were kept at anchor for five tedious days waiting for the English Channel to be cleared of submarines. When we landed in France we went immediately to a rest camp where we spent four days, and then we received orders to entrain in two parties. I was in charge of the second party which consisted of two other officers and 72 men. We had first to march at night five miles over roads paved with cobblestones. On arrival at the station, we found a train of interminable length and were rather dismayed to find how small an amount of space was allotted to us. The men were wearing their full equipment and when they entrained each one had to be helped up to the footboard and then forced through the door by hard shoving. The only place to put their equipment was on the floor and this left no room for the men's feet. In addition to the men and their equipment we had to find room for two days' rations, which were issued to us at the station, and which included an enormous cheese. We had a good deal of difficulty in finding room for them. The cheese was put in the noncommissioned officers' compartment and was found, I believe, very comfortable as a footstool. In spite of the discomforts the men were wonderfully cheerful and were never heard to complain. We rumbled along all night and at about 7 in the morning arrived at a famous city where we spent the day. At night we entrained again and had another uncomfortable night, arriving late in the afternoon at Poperinghe which was at that time 8 or 9 miles from the trenches. We were casually informed on getting off the train that the town had been shelled the day before, and this information with the sight of buildings protected with sandbags made us realize that we were getting near the *real thing*.

The next afternoon I started with a small party of men to take over a collecting station in Ypres. As we approached Ypres we saw more and more of the effects of war, such as shellholes in the ground and in roofs, roofless houses and trees torn in half. Finally we arrived at the *Abomination of Desolation*. The collecting station was in the cellars of a big and much damaged building. I cannot recommend a cellar in early April as an attractive place to use as a residence. Most of the time was spent in reading by a dim lamp in a small damp room, which we tried to heat by means of a stove not much bigger than the lamp. During the day we held occasional sick parades, but the work was usually very light. There was little enough to tempt one to wander about outside in times of idleness. It was a molelike and depressing existence.

Behind our building was a battery which would wake up from time to time and start firing. After a few rounds it would stop and then the Germans would retaliate. We used to hear the German shells passing overhead and exploding behind us. It was not so bad when this occurred during the day, but at night it interfered with our sleep and we liked it still less. On fine days when the light was good for observation a good many shells would drop in to Ypres during the course of the day. Dull rainy days were comparatively peaceful.

We kept a horse ambulance in the courtyard of the building and stabled the horses in one of the rooms. A motor ambulance was kept standing at the end of a long corridor ready to leave at any minute.

In the evening our rations and mail were brought up. A full water cart would arrive and be exchanged for the empty one. One or more motor ambulances arrived to take part in the clearing of wounded, which was always done at night.

As it became dark the horse-ambulance would start off for a rendezvous where it was to receive its load of wounded from the advanced dressing stations. Being a very large and heavy affair it never went faster than a walking pace. We had in addition to the collecting post an advanced dressing station in a dugout a few hundred yards from the front line. This had to be approached through a mile or so of communication trenches. It was a most *unhealthy* neighbourhood. We kept our medical officer here. His turn of duty lasted three or four days. The wounded were collected during the day and were brought down at night in a truck on rails laid in the open. The truck was pushed by stretcher bearers. This duty was dangerous on account of machine gun fire which was turned on from time to time during the night. From the truck the wounded were transferred to the horse ambulance and taken to a point where they could be handed on to the motor ambulances. These quickly whisked them off to the main dressing station which was almost four miles from the firing line. Life for the medical officer there was pleasanter than that nearer the front. The building we occupied had been a convent school and two old Belgian nuns stayed on in it. They spent most of their time making lace and, on occasions when shells fell near, went placidly on with their work.

There was a big gun in the neighbourhood, which was familiarly known as *Tin Lizzy*. She was a horribly noisy neighbour on the occasions when she was at work. From time to time the Boche tried to reach her with shells, but never successfully.

It was an exhilarating moment when one got into a motor ambulance to return from the advanced dressing station to our headquarters in Poperinghe. It meant the near prospect of a change of clothes, sleeping in pyjamas, a bath in the morning and freedom to amuse oneself during the day. One had, of course, to take one's turn at orderly duty. This meant being about the headquarters for 24 hours, taking sick parades. In one's leisure time one could ride about and explore the neighbouring country.

Poperinghe was shelled from time to time in a desultory manner while our headquarters were there and our sleep was broken frequently about an hour before daybreak by bomb raids. When our month of clearing was up we moved to a camp a short distance outside the town. There we had charge of the Division Rest Station. This was a field hospital on a small scale, for patients with minor ailments, who would be able to rejoin their units in four or five days. They were housed in two long huts and slept on stretchers. There was generally enough work to occupy every one during the mornings. The afternoons were devoted to playing games, principally baseball. We had plenty of time to ride about and look up friends in other units. Once a week every man attended a bath parade. The divisional baths were in Poperinghe. The men marched there with their towels and had hot baths. At the same time they were given a change of underclothing and their outer clothes ironed to destroy pediculi and the nits.

We lived a peaceful existence till the 2nd of June, 1916. In the morning of that day we heard that our neighbours, a battery of the Lahore Artillery brigade, had orders to *stand to*. We knew then that something was in the air. At lunch a despatch was brought in to our Commanding Officer ordering us to *stand to* also. News then began to arrive that the Germans were violently shelling the front line of our division and that one of the best battalions in the Canadian Army had suffered very heavily. By midnight our camp was emptied of every available man. Some went up to the advanced dressing stations and others to the main one.

For several nights the work was very heavy. It was believed in England that this might be the beginning of a third battle of Ypres. At first the Germans gained a good deal of ground and inflicted heavy casualties on our division. There were over five thousand killed, wounded and missing. Another Canadian Division came in later, a heavy counter attack was made and nearly all the lost ground was regained. Our field ambulance was singularly fortunate in not having any of our men

killed and only a few slightly wounded. In many cases our stretcher bearers had the wounded men they were carrying on stretchers, killed. One of our men was carrying a wounded man pick-a-back when a piece of shell took the wounded man's head completely off. The severe fighting gradually died down, the casualties became less and less and our division was withdrawn from the line to rest and reorganize. I was sent in charge of a tent subdivision to Steenvoorde, a delightful little French town about seven miles from Poperinghe just within the frontier. I had with me two officers of the field ambulance. We looked after the sick of some of the battalions of our division, who were billeted in the neighbourhood. In our leisure time we rode over to Hazebrouck and Bailleul, both of which places have so often been mentioned in accounts of recent fighting.

One day I received an invitation from my Commanding Officer to return to headquarters outside Poperinghe to play in a cricket match between the commissioned and noncommissioned officers of our field ambulance. I started off on horseback with an orderly and when I began to approach Poperinghe found, to my disgust, that the town was being shelled. I soon began to meet ambulances loaded with civilian as well as military wounded. At the entrance of the town we were stopped by a military policeman and told that the road was closed. We turned back and by making a detour around the outskirts of the town were able to reach camp in time for luncheon. We played our match in the afternoon and while playing could hear the whizz of the big shells going into Poperinghe. After dinner the shelling had stopped and we rode back through the town. The troops had been withdrawn and most of the inhabitants had left, so it presented a forlorn appearance. We had ample opportunity to see the damage done since we had been there last.

Our second turn of duty in the salient came in August and was very different from the first. The battle of the Somme was then in full blast and the Germans had removed many of their guns. We must have been firing ten shells for their one. The weather was hot and dry so that life in cellars and dugouts was not so uncomfortable.

All the time I was in the field ambulance I never gave an anesthetic, nor saw one given. The first place on the way to the base where operations are performed is the Casualty Clearing Station. The important thing in a field ambulance is to get rid of the wounded as quickly as possible in order to be prepared for more and to be able to move with the division, if necessary. The Casualty Clearing

Station is just out of the range of shell fire. It is a field hospital which is less mobile than a field ambulance. As a rule only urgent cases are operated on or were at that time, the rest being put in the train and sent as quickly as possible to a base hospital.

In a severe action a C. C. S. is very busy and I cannot imagine any place where the services of a skilled anesthetist would be more useful. A C. C. S. cannot, however, afford to have too much cumbersome apparatus as when the army moves, it moves too.

Later on in the year 1916, I was sent down to the base again to join No. 1 Canadian General Hospital, which was in need of an anesthetist. There at times the work was very heavy from the Somme fighting. We had four operating tables going simultaneously. One day we had over 70 operations. A few days before we had admitted 760 wounded within 24 hours. There were a great many severe chest wounds. I found the surgeons had a preference for opening empyemata, in bad cases, under nitrous oxid and oxygen. I became convinced that this was, with the apparatus we had, the worst possible anesthetic to use, and urged the use of local anesthesia. I saw very little spinal anesthesia used, though I believe it is popular in some hospitals. At the Duchess of Westminster's Hospital at Le Touquet the anesthetist used intravenous ether with, I believe, most satisfactory results.

One of the after effects of the war will be that the world will be flooded with young men who will call themselves surgeons. A youngster straight from college or who has had a few years of country practice is put in charge of a surgical ward and is allowed either by press of work or by lack of vigilance on the part of the officer in charge of surgery to do an amount of operating, to which he is not entitled by his training or his capabilities. Before he has had time to see the effect of his work his cases are evacuated to another hospital. The patient does not know who he is. There are no critical neighbours or relatives to bring his mistakes home to him. He, therefore, develops self-confidence much more quickly than knowledge, skill or judgment.

Moreover, his pay remains the same whether he works hard or does nothing, and if he is not very conscientious he is liable to do as little as possible and to get careless about the little he does.

Military surgery will make some men into good surgeons, but it will be the spoiling of the medical careers of many more.

When one looks back at the time spent at the front, one remembers most easily the good times, the good comradeship, the merry parties and the making of new friendships. It fortunately takes a certain effort to recall the long periods of intolerable boredom and home-sickness.

To anyone going with the army, I would give one piece of advice. Do not worry about getting a large number of hand-knitted socks or the last pattern of sleeping bag or water bottle. It is not these which will make you comfortable. The important thing is to go with congenial associates. Devote your attention before you go to getting into the same unit with one or more tried friends.

183 MANSFIELD ST.

THE OPERATIVE RISK IN CARDIAC DISEASE.*

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— Since the publication of our previous article on the operative risk in cardiac disease,¹ the number of operative cases complicated by heart disease examined in the Mayo Clinic has markedly increased. Other groups of cardiopaths have been added to the classification, and also they have been included in this report. The greatest difficulty encountered was the classification of cardiopaths into groups of similar patients for comparative study and while the grouping employed is not beyond criticism, it gives a working basis for risk determination. A paper of this sort necessitates the incorporation of statistical data and the presentation of such data is apt to be dominated by monotony. A search of medical literature revealed only scattered reports of operative risk in cardiac disease.

This report does not include all the cases of heart disease coming to operation in the Clinic but it does include those in which electrocardiographic examinations have been made since August, 1914. The advent of the electrocardiograph has been very helpful in the classification of cases by permitting the recognition of otherwise obscure conditions.

Experience has shown that the best index of operative risk in heart disease is the patient's ability to stand physical strain, supplemented, of course, by thorough history taking and thorough physical examination. Patients whose hearts allow them to go about in comfort, or those in whom this can be

effected by medical treatment, are generally considered safe for operation.

In heart disease due to focal infection, such gratifying results are frequently seen following the removal of the focus, that the added risk seems justified. Another group of cases often shows marked cardiac improvement sufficient fully to justify the risk, namely, goiter, uterine fibroids and prostatic hypertrophy. Malignancy complicated by heart disease is generally considered operable if a fair chance for recovery is offered, and such cases often require palliative operations. In very few instances in which there has been urgent need of operation has it been refused on account of the cardiac condition, though in many instances, operation has only been undertaken after preliminary medical therapy.

In every case the decision is based on several factors: (1) The immediate operative risk, (2) the probable improvement of the heart following operation, (3) the patient's relative chance for length of life or general health with and without operation, and (4) in less serious conditions, whether or not the operative relief will justify the added risk. Experience in general has justified the taking of risks in cases demanding surgical intervention.

It is impossible to classify cases on a basis of valvular disease alone because the true index of cardiac efficiency is myocardial quality and this varies greatly in similar disease conditions. A classification based on cardiac reserve alone is also impossible because we have no accurate means of determining this factor and clinical impressions are variable.

Six groups of cases have been studied. These are generally recognized as bad risks, or the worst risks, if angina pectoris and aneurysm are excepted. The groups are: (1) Auricular fibrillation, (2) auricular flutter, (3) impaired auriculo-ventricular conduction, (4) impaired intraventricular conduction (arborization block) (5) mitral stenosis, and (6) aortic lesions including valvular disease, aortitis and dilatation (not aneurysmal.)

Auricular Fibrillation.—This disorder is now recognized as being due to incoördinate contraction of individual muscle bundles of the auricular wall. The auricles no longer contract, their walls dilated in diastole act as reservoirs in the general circulation. As the result of this disordered and inadequate stimulus production, the ventricular response is incoördinate and a pulse results which is usually totally arrhythmic. This condition may be chronic, intermittent or paroxysmal.

*Read during the Sixth Annual Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ill., June 26-27, 1918.

Situations.—Experience with exophthalmic goiter (hyperplastic toxic) has shown auricular fibrillation to be a frequent, disordered cardiac mechanism occurring in the course of the disease. Fibrillation occurs more frequently in the patient more than 40 years of age, and is often indicative of a relatively high degree of hyperthyroidism. The myocardiums of older patients, of course, do not tolerate toxic insults well, and fibrillation is very prone to be a permanent condition. The occurrence of this arrhythmia in young people usually evidences a high degree of hyperthyroidism for the hearts of younger patients usually stand strain well. In this group, 104 patients have been operated on with 4 deaths. One patient died following a Porter hot water injection and 3 following thyroidectomy. Of the latter, 2 died of hyperthyroidism and 1 of myocardial insufficiency on the second day after operation. Ten patients were under 30, twenty between 30 and 40 and seventy-four were more than 40 years of age. The operative mortality was 4 deaths in 104 cases (3.8 per cent) which compares favorably with the normal operative mortality of 2.6 per cent.

Thyrotoxic Adenomas.—Many patients having adenomas (simple goiter) for a certain number of years, develop symptoms of thyroid intoxication. The onset of symptoms is frequently insidious and the initial subjective complaints, those of a failing myocardium. These patients are usually older, beyond 40 years of age, and as I have mentioned, the heart muscle does not tolerate toxic influences well. Added to this is an insidious onset. This group presents many cardiopaths. Experience has shown that such patients so often show striking cardiac improvement following thyroidectomy that the added risk seems fully justified. All patients with fibrillation are, however, subjected to preliminary medical treatment which is continued after operation if the case demands it. Thirty-six patients with fibrillation had thyroidectomies with one operative death, giving a mortality of 2.7 per cent. The normal operative mortality in this group is 2.8 per cent. The favorable showing is owing largely to preoperative therapy and to the correlation between the surgical and medical services.

Other Conditions.—There were 10 cases of fibrillation in patients less than 40 years of age and 20 in those more than 40 years of age, constituting a total of 30 cases in which operative measures were employed. The operations were as follows: 12 tonsillectomies, 4 excisions of epitheliomas (2 lower lip, 1 glands of the neck and 1 larynx), 1 excision of glands for diagnosis (sarcoma), 3 cholecystectomies and appendectomies, 3 gastro-enterostomies

(2 for ulcer and 1 for carcinomatous obstruction), 1 cholecystectomy, choledochotomy and appendectomy, 1 Talma-Morrison, 1 herniotomy, 1 cataract extraction, 1 suprapubic stab, 1 cauterization for urethral caruncle and 1 cystotomy and prostatectomy. There were 2 early deaths, 1 cardiac, following suprapubic stab, and 1 due to cholangitis following cholecystectomy.

Auricular Flutter.—This cardiac disorder is recognized as being due to rapid coordinate contractions of the auricles, stimulated by foci of irritation located in the auricular wall outside the normal pace-maker (sino-auricular node). The auricles contract at a rate of 200 to 380 per minute and the ventricles respond usually to one-half the auricular contractions, although any rhythm from a 1:1 association to a complete heart block may exist. The pulse is regular in one-half the reported cases and grossly irregular in the other half. The degree of block may vary from time to time and most patients are subject to paroxysmal "weak spells," owing to sudden decrease in the degree of block which allows the ventricles to assume full auricular rate. The condition is usually chronic and may exist for years.

Four patients have been operated on, all included in the foregoing under fibrillation. These patients are of particular interest as apparently being the first proved cases of flutter coming to operation. A previous report² showed that these four patients were subjected to vigorous digitalis therapy, and rest until fibrillation was induced, and then operation was done.

Three of the patients had exophthalmic goiter, though one had a cholecystectomy and tonsillectomy in the Clinic and a thyroidectomy, later, elsewhere. One other patient had had tonsillectomy. All the patients with exophthalmic goiter resumed a normal rhythm after operation, and two had no further cardiac symptoms. The last patient on whom a tonsillectomy was performed, reports himself greatly improved. Thus far there has been no mortality.

Partial and Complete Heart Block.—One patient with complete block has had three operations in 11 years; appendectomy, radical amputation of the breast for carcinoma, and excision of recurring nodules of the skin. An electrocardiogram was taken before the last operation. The pulse was recorded as being unusually slow at the previous examinations. The patient is alive and quite well.

Ten patients showing delayed conduction between auricles and ventricles, that is, auriculo-ventricular intervals of 0.22 to 0.28 of a second, have been operated on as follows: 4 tonsillectomies, 1 double ligation of the superior thyroid vessels for exoph-

thalmic goiter, 1 double ligation and subsequent thyroidectomy for exophthalmic goiter, 2 thyroidectomies for thyrotoxic adenomas, 1 cholecystectomy and 1 prostatectomy. Six were more than 40 years of age and 4 were under 40 years. The patient on whom prostatectomy was done died on the fourth day, presenting the cardio-vascular renal syndrome.

Intraventricular or Arborization Block.—This condition is due to impaired conduction of the cardiac impulse after its passage through the bifurcation of the auriculo-ventricular bundle and evidences disease of the main bundle branches and the subendocardial plexus. Oppenheimer and Rothschild have emphasized the gravity of this condition and the early fatality which often indicates. The electrocardiogram reveals a prolonged Q. R. S. interval and variations from slight notching to the unusual complexes which are ascribed to branch bundle defects. A striking observation in this group of cases is the uniformity with which the clinical findings are substantiated by the graphic records in revealing serious myocardial disease. Twenty patients have been operated on, 7 under 40 years of age and 13 more than 40 years, without any operative mortality. There were 8 tonsillectomies, 5 thyroidectomies (3 for exophthalmic goiter and 2 for thyrotoxic adenoma), 1 salpingectomy, 1 cholecystectomy and appendectomy, 2 chest aspirations, 2 gland excisions for diagnosis (1 malignant and 1 inflammatory) and 1 posterior gastro-enterostomy for duodenal ulcer.

Mitral Stenosis.—Seventy-three cases of mitral stenosis are recorded in which operations were done. Twenty-five of the patients were under 40 years of age and 48 were more than 40 years. As previously stated, valvular disease alone cannot be satisfactorily grouped because of the difficulty in accurately classifying the degree of myocardial insufficiency. This mitral lesion is recognized as being serious owing to its tendency to progression, and therefore the cases have been included in this report. An attempt has been made to estimate by clinical impressions the degree of decompensation present, and, while obviously inaccurate, it is necessary in presenting the type of case represented in this study. The scale of 1 to 4 (minimum to maximum) has arbitrarily been used in denoting the degree of decompensation. The average in patients under 40 years of age was 2, in those more than 40, 2+. Ten patients showed auricular fibrillation; (vide supra) 9 of these were patients more than 40 years of age. The operations are as follows: 39 tonsillectomies, 17 thyroidectomies (10 for simple goiter, 4 for exophthalmic goiter, and 3 for thyrotoxic adenomas), and 4 of these patients had

secondary operations including 2 tonsillectomies, 1 appendectomy and 1 double cataract extraction. There were one double ligation of the superior thyroid vessels for exophthalmic goiter, 4 appendectomies, 1 cholecystostomy, 4 cholecystectomies and appendectomies, 1 choledochotomy, cholecystectomy and appendectomy, 1 subtotal abdominal hysterectomy, 1 perineorrhaphy, 1 trachelorrhaphy, 1 tumor excision (benign) 1 inguinal herniotomy and 1 thoracic paracentesis. There was no immediate operative mortality but one patient died two weeks later of cholangitis following a choledochotomy, cholecystectomy and appendectomy. The mortality in this group is 1.3 per cent. It is impossible accurately to state the normal mortality in such a protean surgical list but 1.5 per cent seems very conservative.

Aortic Lesions.—It has long been recognized that aortic disease needs no emphasis as regards its gravity. This group includes aortic valvular disease, aortitis and dilatation (not aneurysmal). Sixteen patients with aortic valvular disease have been operated on; 11 under 40 years of age and 5 more than 40 years. Six patients presented double aortic lesions, that is, insufficiency and stenosis, and 1 presented evidence of aortitis. One patient had aortic stenosis alone. These patients were all able to be up and about with relative comfort. Anginal pains were not elicited in a single instance. There were no operative deaths but 1 patient is reported dead from heart failure one year later (tonsillectomy). There were 12 tonsillectomies, 1 thyroidectomy for adenomas, 1 cholecystectomy, 1 double herniotomy and appendectomy, and 1 chest aspiration. Two patients with aortitis (not including the aforementioned case) were operated on; both were more than 40 years of age. There were one exploration (general abdominal carcinosis) and 1 tonsillectomy. The latter patient died a cardiac death three months later. Four patients with dilatations of the aorta (not aneurysmal) underwent surgical procedures. The clinical diagnoses in these cases were verified by the fluoroscope. Three of the patients were more than 40 years of age. There were 2 thyroidectomies for exophthalmic goiter, 1 tonsillectomy, and 1 cystotomy and herniotomy. There were no deaths.

SUMMARY.

1. The decision of operability in cardiac disease depends on factors as follows: (1) The immediate operative risk, (2) the probable improvement of the heart after operation, (3) the patient's relative chance for length of life or general health with and without operation, and (4) in less serious conditions, whether the operative relief will justify the added risk.

2. Cases in which the heart permits the patient to go about in relative comfort, or in which it can be sufficiently restored by treatment to allow this, usually are considered safe for operation.

3. Malignancy complicated by heart disease is usually considered operable if a fair hope of cure is offered.

4. The best measure of operative risk is a good clinical impression of the patients' ability to stand physical strain, supplemented by a careful history and a thorough physical examination.

5. Preoperative medical therapy and rest combined with surgical and medical correlation after operation is of paramount importance.

6. The general tendency is to require too great a margin of cardiac safety in surgical work.

DISCUSSION.

DR. WM. HAMILTON LONG, Louisville, Ky.:—I should like to ask Dr. Willius if, at the Mayo Clinic, the technic of anesthesia is in any way modified by the cardiac condition presenting at the time of operation and whether one or more anesthetics have been found available or preferable for distinctive cardiac risk?

DR. WILLIUS, (Closing):—In handling major operations at our clinic, irrespective of the peculiar cardiac conditions, the open drop-method of etherization is used and has been found safe, satisfactory and apparently harmless. Local anesthesia has been found useful in certain cardiac risks presenting for such operations as tonsillectomy and it has also been found safe and efficient. It is difficult to fully judge the element of additional risk which the anesthetic introduces as so many other factors of physio-pathological importance are also involved. In calculating the results of operation and the effects of anesthesia, it is my impression that ether does not of itself exert a detrimental influence on cardiac risks, who have had proper care in preparation. Provided the trauma of the operation is not increased by etherization to the point of depression, the anesthetic, if it has any appreciable action, is beneficial.

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FROM WHATEVER ANGLES IT MAY BE CONSIDERED, AN INVESTMENT IN LIBERTY BONDS OR WAR SAVING STAMPS IS THE BEST INVESTMENT IN THE WORLD. THE MONEY SO INVESTED GOES TO THE GOVERNMENT, WHICH LOANS SOME OF IT TO OUR ALLIES; ALL OF IT IS USED, IN ONE WAY OR ANOTHER, TO MAINTAIN, SUPPORT, ARM AND EQUIP, AND MAKE VICTORIOUS OUR ARMIES AND OUR ALLIES IN EUROPE. SURELY YOUR MONEY COULD NOT BE PUT TO A BETTER PURPOSE. HERE IS AN INVESTMENT IN THE POWER AND SUCCESS OF OUR COUNTRY, AN INVESTMENT IN THE EFFICIENCY, STRENGTH, SAFETY AND SUCCESS OF OUR FIGHTING MEN ON LAND AND SEA.

THE PROPHYLACTIC USE OF PITUITRIN IN NOSE AND THROAT OPERATIONS UNDER GENERAL AND LOCAL ANESTHESIA.*

SAMUEL SALINGER, M.D.,
CHICAGO, ILL.

The action of extracts of the infundibular portion of the hypophyseal gland on the circulation has been well established through the investigations of Schaefer and Oliver, Howell, Houghton and Merrill, Beck and O'Malley, Klotz, Wiggers and others and may be briefly summarized as follows:

1. The blood pressure is raised from five to thirty-five millimeters within a few minutes through direct stimulation of the muscle coats of the arterioles.

2. This increase in blood pressure is prompt and the fall to normal, on the contrary, very gradual.

3. Due to the constriction of the arterioles the actual size of the various organs of the body is diminished with the rise in blood pressure. The kidneys are the only exception to this rule, as they become enlarged upon receiving the pituitary extract and the output of urine is increased.

4. The heart, according to the majority of investigators, is slowed down, probably due to direct depression of the heart muscle, and there is a diminution in the amplitude of the heart's excursions as demonstrated by Wiggers. Also there is a peculiar grouping of the heart beats in periods of two or more. All of these manifestations are most marked just after the crest in the blood pressure curve has been passed.

Based upon these facts the employment of pituitrin in connection with nasopharyngeal surgery was first given an impetus by Cetelli, who reported brilliant results in a number of turbinate and tonsils operations, where it had been used either as a prophylactic or for the control of postoperative hemorrhage. His clinical findings were generally corroborated by other operators with the single exception of Donelan, who, having employed it in twenty-five cases, reported that he could see no difference in the amount of bleeding than in similar cases where no pituitrin had been used.

In 1915, Kahn and Gordon reported their results in a series of 100 cases, mostly children, where they had used pituitrin as a prophylactic. They paid particular attention to the blood pressure and coagulation time of the blood taken before and after the administration of the agent. They found that the

*Read during the Sixth Annual Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ill., June 10-11, 1918.

systolic pressure had been increased in 55.31 per cent. of the cases, reduced in 36 per cent. and unchanged in 8.5 per cent and that the coagulation time had been reduced in nearly every instance.

A short time ago I took occasion to report the results in a series of 100 cases of my own in which pituitrin had been given as a prophylactic and for the control of postoperative hemorrhage. The results considered solely from the clinical point of view were very gratifying. Briefly they showed that in 35 tonsillectomies done under local anesthesia there was only one severe primary hemorrhage, four moderate and 29 slight. Five cases had a postoperative bleeding. In the 53 cases done under general anesthesia there was one severe primary hemorrhage, 16 moderate and 33 slight. There were no secondary or postoperative hemorrhages in this group.

My present report concerns 48 cases in which pituitrin was given solely as a prophylactic against hemorrhage and comprises a study not only of the amount of the bleeding but also of the effect on the blood pressure and coagulation time. The procedure was as follows: Blood pressure and coagulation were taken and followed immediately by a hypodermic of pituitrin, 1 cc. to adults and $\frac{1}{2}$ to 1 cc. to children. After a lapse of fifteen minutes the blood pressure and coagulation time were again taken and the patient sent to the operating room. As the majority of the cases were operated on in the afternoon, I had the blood pressure taken again on the following morning before the cases were dismissed from the hospital.

The striking features of these experiments, showing the action of the pituitrin were the uniform and prompt rise in blood pressure, the consistent lowering of the coagulation time and the absence of postoperative hemorrhage. These we shall consider seriatim.

BLOOD PRESSURE.

All of the cases, with but one exception, showed a rise in blood pressure averaging 10mm. systolic and 6mm. diastolic, which was manifest fifteen minutes after the injection. This increase was maintained in 60 per cent. of the cases for as long as 18 hours. At the end of that time 18 per cent. of the remainder had reached the same level as prior to the injection and 22 per cent. had fallen below that level. This demonstrates that the action of pituitrin is far from being short-lived and corroborates the statement of Klotz, who asserted that the increase in blood pressure may be sustained for as long as 24 hours. More significant in relation to the anesthesia is the fact that post-

operative depression was combated to a great extent through the sustained blood pressure. Pituitrin has been used in a number of surgical conditions for the treatment of shock. Being prolonged in action, it exerts a twofold influence in these nose and throat operations when employed as a prophylactic and makes for a more prompt recovery.

COAGULATION TIME.

Determining the coagulation time of the blood is a more or less variable procedure because of the variety of methods that may be employed and the difference in judgement as to the exact moment when the coagulation may be considered complete. To be absolutely correct and avoid mixing the blood with tissue juices as in skin punctures one would have to take the blood directly from a vein. In the present series this was not feasible and we had to resort to the old fashioned ear puncture, inaccurate though it may be for the determination of the absolute coagulation point. However, the method by which coagulation time is determined is really immaterial for comparative purposes as long as the same method is employed in each case on both occasions, the punctures made in the same manner, a free flow of blood established without massaging the tissues and drops of equal size examined. These precautions were observed and the results showed definitely a decrease in coagulation time of from $\frac{1}{2}$ to 5 minutes. The slowest coagulating blood (case No. 9) which took nine minutes was reduced to four minutes by the pituitrin. There was only one case in which the coagulation was unaffected, (case No. 18), although this case showed an average rise in blood pressure with a return to normal within 18 hours.

PRIMARY HEMORRHAGE.

The amount of blood lost at the time of operation was none or slight in 74 per cent and moderate in 26 per cent of all cases. In relation to the anesthesia, of fifteen cases done under ether, ten were accompanied by slight and five by moderate bleeding of which one was controlled by ligature and the other four by pressure. Of 33 cases done under local anesthesia 25 showed a slight and eight a moderate bleeding all of which were controlled by direct pressure.

POSTOPERATIVE HEMORRHAGE.

There was only one case in which postoperative bleeding was noted; occurring eight hours after a moderate primary bleeding in a young woman of eighteen whose tonsils were removed under local anesthesia. This patient, by the way, showed a rise in blood pressure under the influence of pituit-

THE PROPHYLACTIC USE OF PITUITRIN IN NOSE AND THROAT OPERATIONS UNDER GENERAL AND LOCAL ANESTHESIA.

BLOOD PRESSURE. COAGULATION TIME.

No.	Sex	Age	Operation	Pre-op. B.P.	Pre-op. C.T.	Post-op. B.P.	Post-op. C.T.	Pituitary Bleeding	Secondary Bleeding	Anesthesia Remarks	Remarks	No.
1	T. S.	22	Tonsil	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Arterial re-quiring pressure	None	Cocain Quinin & Urea		1
2	D. F.	22	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain		2
3	D. F.	22	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether	Secondary operation	3
4	T. F.	22	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea	Secondary operation	4
5	A. H.	20	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate re-quiring pressure	None	Cocain Quinin & Urea		5
6	F. S.	8	Septum & Mid. Turb.	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain	Patient has T. B.	6
7	L. S.	8	Tonsils & Adenoids	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		7
8	A. I.	9	Adenoids	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain	Secondary operation	8
9	M. B.	29	Tonsils & Adenoids	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		9
10	F. M.	29	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		10
11	R. S.	21	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain		11
12	M. S.	35	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		12
13	C. T.	25	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		13
14	F. W.	25	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate	None	Ether	Took the anesthetic poorly	14
15	A. W.	25	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		15
16	D. B.	25	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain		16
17	H. L.	28	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Profuse venous re-quiring pressure	None	Cocain Quinin & Urea	Gagged violently. Oper. lengthy	17
18	R. Z.	17	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		18
19	I. C.	27	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain		19
20	M. M.	27	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		20
21	J. B.	19	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		21
22	M. I.	28	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		22
23	M. B.	23	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		23
24	G. M.	34	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		24
25	L. G.	34	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	One spurter clamped	None	Cocain Quinin & Urea		25
26	O. R.	28	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate	None	Cocain Quinin & Urea		26
27	A. O.	27	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain		27
28	D. M.	16	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		28
29	J. G.	15	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		29
30	E. B.	15	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		30
31	A. B.	18	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		31
32	A. F.	17	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Arterial: ligature applied.	None	Ether		32
33	C. C.	27	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain		33
34	R. S.	27	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		34
35	E. E.	17	Septum	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	None	None	Cocain		35
36	M. M.	43	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Arterial: controlled by press.	None	Cocain Anesthesine		36
37	H. L.	13	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		37
38	A. P.	20	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate	None	Ether		38
39	S. G.	24	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		39
40	G. B.	27	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		40
41	M. S.	28	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Quinin & Urea		41
42	F. B.	23	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Ether		42
43	G. B.	18	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate	Slight about 8 hours later	Cocain Apothesine	Small clots a few hours later	43
44	J. D.	26	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate	None	Cocain Quinin & Urea		44
45	R. G.	21	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocaine		45
46	L. B.	32	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Slight	None	Cocain Apothesine	Had 1/2 strength	46
47	M. A.	33	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Arterial: controlled by press.	None	Ether	Quinine & Ur. HMC before op.	47
48	M. P.	28	Tonsils	100 S, 142 D.	152 S, 90 D.	130 S, 90 D.	2'	Moderate	None	Ether		48

rin from 119 S.-87 D. to 130 S.-98 D., lasting until the following morning when the readings were 127 S.-90 D. Her coagulation time had been reduced from four to three minutes. Aside from this case there was only one other patient who had a clot form in the tonsillar fossa, the remainder being entirely free from blood.

Considering the series as a whole 13 of the 48 cases showed a moderate primary hemorrhage and 35 only a slight bleeding. I employ the latter term as referring to a bleeding that ceases promptly after the wound had been made and requires no topical application of any sort. Of the 13 moderate hemorrhages, eight were venous easily controlled by direct sponge pressure. The other five were distinctly arterial, the spurters being either clamped or compressed. (In one case a ligature was applied.)

The fact that there was only one postoperative hemorrhage (that being a very slight one, is evidence of the efficacy of the prophylactic which is further born out by the persistence of the action of the pituitrin as shown by the continued elevation of blood pressure.

As to untoward manifestations directly attributable to the pituitrin, the only one noted was the occurrence of uterine contractions in several of the female patients. Some of them complained of *cramps* a short time after the administration of the hypodermic which lasted from fifteen minutes to an hour but were not severe enough to require any particular attention.

In closing it must be pointed out that pituitrin is contra-indicated in cases of arteriosclerosis or high blood pressure from other causes.

I desire to express my appreciation to Dr. L. B. Phelps of the staff and Drs. Casserly and Adamo, internes of the Francis Willard Hospital for courtesies shown and assistance rendered in the assembling the data of this series.

25 E. WASHINGTON ST.

DISCUSSION.

DR. JOHN W. SEYBOLD, Denver, Col.:—I recall one case in which I used pituitrin for hemorrhage after a tonsillectomy, when all other remedies and methods had failed, and in that instance it proved a life-saver.

DR. BEN MORGAN, Chicago, Ill.:—Pituitrin has been a hobby with me. I cannot say, however, that my experiments with it on animals has verified some of the effects claimed for pituitrin clinically. In experiments on dogs the blood pressure is not maintained for any length of time. Clinically, however, I have found its use invaluable for shock, especially in operations for abdominal tumors. One of its peculiarly valuable features is its re-establishment of peristalsis postoperatively. So far as tonsillectomy is concerned it must be remembered that the sort of anesthesia used and the expertness with which the anesthesia is handled may materially influence the factor of hemorrhage. While pituitrin may be used routinely as Dr. Salinger suggests, it would be contra-indicated in patients who are pregnant for fear of its effects.

DR. R. M. WATERS, Sioux City, Iowa:—I am rather inclined to credit the excitement incident to the dread of operation for the blood-pressure results which Dr. Salinger has presented.

DR. E. I. MCKESSON, Toledo, Ohio:—The question arises as to what is a normal amount of hemorrhage after tonsil operations. My experience in giving anesthesia for many operators, leads me to believe that hemorrhage is a very variable factor. The best operators probably have some ten hemorrhages in a thousand cases; other and less skillful operators have many more. Personally I have found that in using nitrous oxid-oxygen for tonsil operations in the forward-inclined-sitting posture; hemorrhage, with a skilled operator, in negligible and may be remarkably controlled by immediate oxygenation as soon as the operation has been completed.

DR. F. H. MCMCHAN, Avon Lake, Ohio:—I can personally vouch for the efficacy of pituitrin as a hemostatic, both for prophylaxis and control. On two occasions at least it has kept me from being exsanguinated from hemophilic bleeding. Perhaps its most interesting effect is in its psychic stimulation. Only those who have experienced a depleting hemorrhage and the prompt resuscitation of pituitrin can appreciate its immediate and prolonged effect. I have also found pituitrin of value in the control of anaphylactic shock due to reinfections in arthritis.

DR. SALINGER, (Closing):—Primary hemorrhage depends on many factors,—the technic, the anesthesia, the time consumed and the character of the tonsillar tissue involved. The comparative value of pituitrin as a prophylactic is not in preventing primary but secondary hemorrhage and in obviating psychic shock. While the pre-operative blood-pressure may be influenced by excitement, I am rather inclined to credit pituitrin with the very prolonged effect on blood-pressure which we have observed. Its action is not fleeting but endures from 18 to 24 hours. I am glad to hear Dr. Mechan corroborate these effects of pituitrin from personal experience. Physicians, whose patients I have operated upon, now tell me that they can tell the difference in those who have had pituitrin by their sense of well-being. Just what is involved in the effect of pituitrin on diminished coagulation time it is difficult to say, except that pituitrin is a very potent oxidizing agent.

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WE DO NOT KNOW WHAT COMMERCIAL AND INDUSTRIAL CONDITIONS WILL BE WHEN THE WAR CLOSES, BUT WE DO KNOW THAT LIBERTY BONDS AND OTHER U. S. GOVERNMENT SECURITIES WILL BE SOUND AND SECURE. WITH EVERY POSSIBLE DOLLAR INVESTED IN THE GOVERNMENT, THE AMERICAN PEOPLE WILL BE WELL PREPARED TO MEET THE PROBLEMS PEACE WILL BRING. INSURE THE FUTURE BY INVESTING LIBERALLY NOW.

COMBINED ANESTHESIA FOR CESAREAN SECTION.*

J. CLARENCE WEBSTER, M. D.,

CHICAGO, ILL.

During my nineteen years of work in the Presbyterian Hospital I have given great attention to the use of anesthetics in pelvic and abdominal surgery and in obstetrics. The indiscriminate use of ether has always seemed to me indefensible. I was one of the first to use the Schleich infiltration method, gradually adopting Solution No. 2:

Cocain muriat	0.100
Morphin muriat	0.025
Sod. Chlorid	0.200
Aq. distil.	100

as a standard.

I carried out many minor and major operations very satisfactorily in cases in which prolonged general anesthesia is not considered advisable, *e. g.*, old age, renal, pulmonary and cardiac diseases, marked anemia, chronic wasting diseases and sepsis.

In recent years, when the value and safety of novocain became established, I gradually employed it to a greater and greater extent, finally abandoning the use of the Schleich mixture.

Five years ago I first advocated the use of methylene blue to color the infiltrating solution in order that in operating one may be certain as to the extent of the area of infiltration. In this way the operator need not use knife, scissors or needle in an unanesthetized area, thereby protecting the patient from sudden pain.

About eleven years ago I began to use nitrous oxid gas and oxygen both in obstetric and in surgical work, either alone or in conjunction with local anesthesia. In the maternity department of the Presbyterian Hospital the analgesic use of nitrous oxid and oxygen in cases of labor has been established as a most valuable means of relieving suffering without risk to the mother or child, chiefly through the work of Drs. Lynch, Heaney and Henry Davis. Previous to 1909, Cesarean sections, whether abdominal or vaginal, had always been performed under ether or chloroform. In several cases of renal and pulmonary disease I had safely carried out these operations under nitrous oxid and oxygen. In 1909, I performed my first abdominal Cesarean section under local anesthesia. The case was that of an elderly primipara in advanced pregnancy with nephritis, the pelvic inlet being blocked

by a tumor of the right side of the uterus. The patient was a stout woman, general edema being very marked. The abdominal wall was infiltrated with Schleich Solution, and after it was opened the uterus was incised without infiltration, the child removed, and afterwards the placenta and membranes. The uterine incision was closed with catgut and the abdominal wall then sutured, the entire operation lasting only twenty minutes and causing very little discomfort to the patient. Both mother and child were saved.

Three weeks ago, I again performed an abdominal section on this woman for adnexal disease. I found a symmetrical bicornuate uterus. There was a mere linear trace of my former incision in the left horn which had been pregnant, and to it the omentum was adherent. The tumor which had blocked the pelvis during the pregnancy was the greatly hypertrophied non-pregnant right horn which had been gradually forced downwards under the pregnant horn.

As a result of this experience in 1909, I employed local anesthesia in all cases of Cesarean section in which ether did not seem to be advisable. Gradually I adopted it also in cases in which ether might safely be used. The youngest female in whom the local anesthesia has been employed was an unmarried girl under fifteen years of age.

In the great majority of cases the chief distress produced in the operation was the pricking of the skin by the needle carrying the solution. Several years ago I first recommended the use of nitrous oxid analgesia to give the patient relief from this distress, and it has been a very satisfactory adjunct. I advise this combination because it is generally advisable to make a large incision in the abdominal wall in order to expose the separated recti abdominis muscles for the purpose of making a satisfactory closure of the wall at the end of the operation. The infiltration of the parietal peritoneum at the site of incision cannot be too strongly urged. A self retaining retractor is then placed in the abdominal incision, which is stretched widely as far as necessary. The anterior wall of the uterus is thus exposed. If the patient is nervous and strains at all so as to force omentum or intestines down from above, a long strip of prepared gauze soaked in warm saline may be inserted between the abdominal wall and the upper part of the uterus. If the patient be quiet, this is not usually necessary. Two ampules of pituitrin are then injected into the wall of the uterus. When blanching and hardening of the wall begins to be well established, a vertical incision about five inches in length is made in the upper part of the

anterior uterine wall as near the middle line as possible. This is carefully carried down to the amnion, which immediately bulges through the opening. An assistant is instructed at this stage to press the abdominal wall against the uterus and to keep up this pressure during the emptying of the organ. This insures that very little amniotic fluid escapes into the peritoneal cavity.

The amnion is opened, a hand is introduced to grasp the breech of the fetus, and the latter is extracted and given to an assistant after division of the cord. This extraction sometimes causes the mother distress when undue force is used in turning or delivering the infant. In such a case, the nitrous oxid-oxygen mixture gives rapid relief. The uterus now rapidly retracts and frequently the placenta is partly expelled through the incision. The hand should be introduced to peel it and the membranes from the greatly reduced area of the wall. If the cervix be undilated, as in many primiparae, it may be opened by uterine dilators passed into the uterus through the uterine incision. This allows of drainage from the uterus.

The intestines should now be carefully covered with a saline gauze pack and the uterine incision closed. The latter is, of course, smaller than before the removal of the child owing to retraction of the musculature. The broad surfaces of the incision are apposed by several layers of continuous iodized catgut and the peritoneal edges of the surface turned inwards. The gauze is then removed from the peritoneal cavity and the parietal peritoneum closed with iodized catgut. Through and through strong braided silk sutures, made non-capillary by rubber infiltration, are passed through skin, anterior sheath layers and recti muscles. The anterior sheath layers are approximated with iodized catgut, the skin edges brought together with fine silk or linen, and the large silk splint sutures tied last.

As a rule, the effects of the novocain first infiltrated in the abdominal wall is sufficiently marked to allow this suturing to be carried out without distress to the patient. If she complains, relief is given by the analgesic administration of the nitrous oxid gas and oxygen.

It is to be noted that I made no mention of using a local anesthetic in the uterine wall. This is entirely unnecessary. Incision of the body of the uterus causes no pain. If, however, it is necessary to perform any work in connection with the ligaments of the uterus or with the adnexa, pain may be caused and it is advisable to use novocain infiltration or gas and oxygen analgesia. It may be

interesting in this connection to recapitulate the observations published by me years ago, based upon studies made on cases in which I performed abdominal section without an anesthetic of any kind. These were practically identical with those made independently and unknown to me at the time, by the late Dr. Lennander of Upsala.

The abdominal wall is sensitive in its entire extent. The parietal peritoneum everywhere in particularly sensitive, whether it be pulled, sutured, cut or pinched. Separation of adhesions between any structure and the parietes causes pain, save when the adhesions are very slight.

The visceral peritoneum is, in general, insensitive. Separation of adhesions between viscera or between them and new growths causes no pain except probably when traction is made on ligaments or mesenteries. Ligation, division or cauterization of the omentum is not noticed by the patient. If it be forcibly pulled downward, distress is caused. Similarly, the intestines are insensitive, but if they are handled so that their mesenteries are stretched, pain is caused.

Removal of the vermiform appendix causes no distress, except when adhesions between it and the parietes are separated or its mesentery is stretched. Compression, ligation or division of the broad ligaments causes pain.

Incision, suturing or cauterization of the uterus is usually not noticed by the patient, but she complains when the organ is pulled forcibly so that its ligaments are stretched. When the adnexa are adherent to the pelvic wall, separation causes distress; but gentle manipulation of them is usually unnoticed. When the ovary is squeezed, cut or sutured, distress is usually caused. Separation of the bladder from the uterus produces little or no distress. Division of the wall of the vagina in an hysterectomy causes pain.

Sponging of the visceral peritoneum is painless, whereas the same procedure applied to the parietes causes distress varying according to the degree of force employed.

The pain caused by the removal of a gauze pack from the abdomen is probably due either to irritation of parietal peritoneum or to traction on some portion of mesentery. Slow injection of hot normal saline solution (105°-108° F.) usually is not distressful. When, however, the abdomen is unduly distended, the patient complains.

Pain felt within the abdominal cavity in disease or operations, as stated by Lennander, has to do with parts innervated by the intercostal, lumbar

and sacral nerves, i. e., the diaphragm, the abdominal parietes and those viscera which are innervated to any extent by these nerves, or are in near relation to them.

In recent years I have performed more than sixty conservative abdominal Cesarean sections, either entirely under local anesthesia or with the aid of nitrous oxid-oxygen analgesia. In every case mother and child survived. As regards the former, I cannot claim that this is a better record than that obtained when I employed chloroform or ether, for during that period I never had a maternal death. Indeed, in my twenty-eight years of practice, I have performed the conservative operation about one hundred and seventy times without losing a mother. As regards the child, three deaths belong to the chloroform-ether period. Two of these were premature, the other had defective heart. In a good many cases the babies did not breathe when delivered and were restored only by artificial respiration and stimulation.

In the series of operations under local anesthesia, the baby breathes very soon after delivery in the majority of cases. In conditions of eclampsia, however, and in a very few cases where no cause was evident, artificial respiration was necessary.

There can be no doubt that as regards the *fetus in utero*, Cesarean delivery by local anesthesia causes the least disturbance. Next in safety is local anesthesia with nitrous oxid analgesia. Next is ether, while chloroform stands last. The effects of chloroform, ether and nitrous oxid *on the fetus in utero* have been thoroughly studied in Rush Medical College by Graham, Woodyatt, Sansum and Henry Davis, and their findings are of great value.

While in recent years we have strongly advocated the use of nitrous oxid as a means of reducing the suffering caused by labor, we do not claim that this agent is free from risk to the fetus. Long-continued free administration of this gas may be dangerous, probably because of interference with cell oxidation. However, our use of the gas in labor does not imply an approach to this dangerous standard. The gas should be given with oxygen when possible, and only the slightest dosage is necessary to obtain analgesia. Deep anesthesia is not needed except in the delivery of the head through the vulva. Between labor pains the gas is not given and the patient quickly recovers from the very slight asphyxiation produced by the period of analgesia.

104 S. MICHIGAN AVE.

HIGH PRESSURE ANESTHESIA FOR CAVITY PREPARATION.

LIEUT. COL. RAYMOND E. INGALES, D.C.

Dental Surgeon to Camp Fremont, U. S. A.

PAULO ALDO, CHL.

The handwriting is on the wall; the admonition is to prepare, for the public is beginning to demand less pain in the dental chair. The urgency, the wisdom, the necessity for the *slacker* to adopt one or several of the means at hand for the prevention of pain is rapidly becoming more and more acute. "Man must progress or he is certain to retrogress," is a simple statement of undeniable truth particularly applicable to members of the dental profession. The vulnerable and absorbing point with the person in need of dental service is always the dread of being hurt. The dentist is well aware of this fact, even more so than the public. Glib and voluminous as has been the sum total of what has been spoken and written on the subject, yet only a mere residue of doubtful generalities is probably left in the mind of the busy practitioner in pursuit of information. This may be a plausible excuse in many instances for the lack of interest on the subject; however, the impressive statement of the Hon. George A. Post, the president of the Railway Business Association, New York, may be *apropos* of the situation: "We are not acquainted with the coward who could venture nothing, the penurious who would spend nothing, the indolent who would do nothing, the critic who carps at everything that does not originate with him, and the visionary who bawls loudly for the instant approval of anything he thinks he thinks."

The compressed-air obtunder or any other of the present types of high-pressure syringes will never become popular with the average practitioner; the technic is the restraining factor. Not that the rank and file do not possess the mental faculty for mastering the technic, but they will not do so.

VARIOUS METHODS SHOULD BE STUDIED.

Of all the appliances and methods for the relief of pain in dental operations, none are perfect or nearly so, but each possesses certain merits not found in others. For this reason the operator should understand more than one method. Before giving the advantages of the high-pressure syringe method, certain statements on other methods by men of national repute will be given.

NITROUS OXID ANALGESIA.

The following quotation, taken from recent dental literature, was made by a nitrous oxid analgesia enthusiast: "The diet preparatory for nitrous oxid analgesia should be the same as for anesthesia, viz., a fasting condition for three hours. . . . The patient most sure to bring failure is the one who is accustomed to the use of strong drink as a matter of habit. . . . Patients addicted to the use of drugs, either as an uncontrollable habit or as a medical treatment, will be found to be unreliable. . . . Patients who make no effort to co-operate with the dentist, due to inability or refusal to exert will-power, will be found unsatisfactory; suggestion in these cases avails us nothing, for the reason that the patient will not dwell upon our statements."

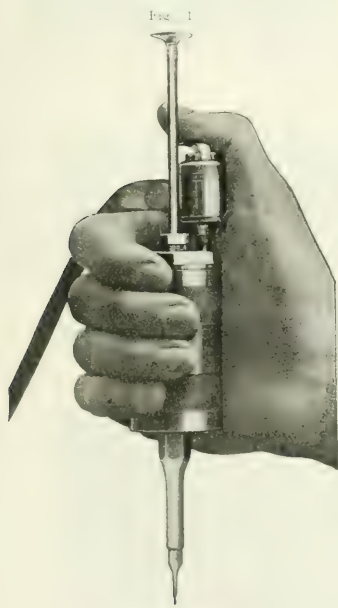
CONDUCTIVE ANESTHESIA.

Speaking of the pterygo-mandibular injection in conductive anesthesia, one writer states, "Anesthesia occurs in from fifteen to twenty minutes." Under the heading of "After-effects," the same author informs us that—"There are swellings which disappear without treatment and possibly pain from the above sources or from infection during or after the operation."

Referring to intra-osseous, infiltration, and conductive anesthesia, another dentist comments on certain physiological symptoms. This writer's remarks are similar to those made by others: "Seventeen showed decided symptoms of intoxication to a greater or less degree. . . . Only two lapsed into a state of coma."

With the numerous reports of satisfactory results of pain-saving procedures other than the high-pressure

syringe method, any attempt to detract from their excellence would only bring deserved ridicule; there is no intention to depreciate their worth—and I may say here that I do not rely wholly on compressed-air obtunder. Preliminary preparation, such as diet and loosening of tight clothing, are not necessary in high-pressure anesthesia. Alcoholics and drug-fiends respond to treatment as quickly and as readily as obtainer. A reassuring talk to gain the patients' confidence so that they will make an effort to assist the operator by a concentration of will-power is entirely unnecessary. It is only necessary to display the obtunder and inform them that the flat needle-point will be held against the tooth until a sufficient amount of the anesthetic is absorbed to enable the operator to perform the work in hand painlessly. The operator can assure the patient that there will be no pain at any time, either in using the obtunder, in operating, or following the treatment. There is no waiting for the anesthetic to be absorbed, as in conductive anesthesia, and excavating may begin immediately after using the obtunder in from thirty seconds to two minutes. As to physiological symptoms and after-effects, there are none.



The syringe.

DESCRIPTION OF THE SYRINGE.

The compressed-air obtunder provides a positive means of furnishing a consistent pressure without special effort on the part of the operator. The working parts of this instrument are made of correct mathematical size so that, with a source of air-pressure of forty pounds, a pressure of three thousand pounds to the square inch can be produced in the liquid-chamber of the syringe. A cross section of the opening in the needle-point, which is of No. 22 gage, measures only an infinitesimal fraction of a square inch, therefore very little effort is required to hold the obtunder against the tooth, merely the weight of the instrument being almost sufficient to give close contact.

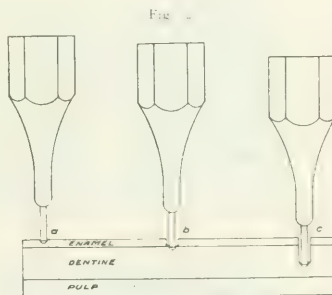
PREPARING THE POINT OF INJECTION.

Fig. 2 represents the three stages in preparing the pit and desensitizing the dentin. A sharp No. 1 round bur is selected and the enamel is cut into about one-half or a little more of the depth of the bur's head, forming a miniature hemisphere. This initial pit is best started by

holding the bur with its long axis parallel to the surface of the tooth rather than at right angles, as the bur cuts much faster when held in this position. The rubber dam is unnecessary unless otherwise needed for the work in hand. Having previously drawn the anesthetic into the obtunder and warmed it to about body temperature by holding the liquid-chamber over a flame, grasp the knurled barrel in the right hand (Fig. 1) and use the thumb to manipulate the cut-off. The needle-point is then placed in the pit (Fig. 2, a), and gentle pressure is exerted with the hand, using a slightly rotating motion. The air is allowed to enter the obtunder slowly. When the finger-lift comes to a stop, it indicates that the tooth is receiving full pressure. The instrument is held in this position for precisely twenty seconds—not guessing at the time. The seconds should either be counted or timed with a time-piece. The injection will then be driven between the enamel rods and into the dentin. A slight leak of the anesthetic around the needle-point or the escape of a small amount of air from the air-chamber will not retard the effectiveness of the anesthetic.

LIQUID-TIGHT CONTACT NECESSARY.

The discouraging factor to the beginner in high-pressure anesthesia is the inability to always have the contact between the tooth and the needle-point liquid tight, but this readily becomes the simplest part of the procedure after some practice. If a leak occurs it may be due to one of several causes; either the pit is imperfectly formed, or the needle-point is worn, or its margins broken so that it is not perfectly round. Or perhaps the engine hand-



piece was not held steadily, or a worn bur was used, in which case it is impossible to form a pit absolutely symmetrical in outline. The flat end of the needle-point should form a perfect right angle with the outer cylindrical surface of the pit—the needle-point must be square, and not rounded. This may be secured by dressing down the point with a cuttle-fish disk. Indeed, this little precaution had best be taken after every three or four cases. The operator may at times resort to the use of a few cotton fibres between the needle and pit, this is seldom necessary.

The next step is to enlarge the pit with a No. 3 round bur, and deepen it down to the dentin. If the enamel is thin, as it is near the gum margin, do not change burs. With the No. 1 bur make a depression in the enlarged pit to receive the needle (Fig. 2, b). The obtunder is now applied for fifteen seconds. This injection is largely in the nature of a precautionary measure, to make sure that there will be no pain when the dentin is penetrated farther with the bur. The pit is finally deepened to two-thirds of the distance to the pulp, and again countersunk with the small bur (Fig. 2, c).

APPLYING THE ANESTHETIC.

The time allowance for the use of the obtunder at this stage depends principally on the tooth being treated, although the age of the patient should be considered—the older the patient the longer the time required to desensitize the tooth. Of course in youth the pulp is large and the dentinal tubules more adapted to receiving the anesthetic, while in older patients there are deposits of dentin,

perhaps curly dentin, making anesthesia more difficult, and pulp. For a person, say, thirty years of age, forty-five seconds should be allowed for lower incisors and upper laterals; one minute for upper central incisors, canines, lower bicuspsids, and upper second bicuspsids; one and one-half minutes for upper first bicuspsids, and two minutes for molars. The lengths of time given should be doubled if the pulp is to be extirpated. Should there be any escape of the solution from around the needle-point in the final application of the instrument, it may be assumed that the pit is irregular in outline. It is a simple matter to straighten the walls with a spear-point, dentate, or fissure bur.

LOCATION OF THE POINT OF INTERSECTION.

The pit should be included in the finished cavity, but should not be disturbed until the balance of the cavity is prepared, as there may be some sensitiveness remaining that would necessitate further use of the obtunder. As the enamel walls become thinner toward the cementum, it is easier to make the pit near the gingival line. The best results are obtained by making the pit in healthy dentin near the junction with the affected area. The point of injection should be made at the most accessible point in the cervical portion of the tooth when preparing a tooth for a crown abutment. If a pulp extirpation is desired in the case of a badly decayed molar in which the pulp is almost exposed, the most accessible point at which to use

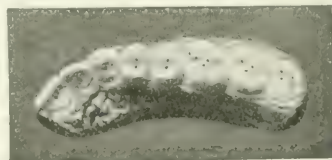
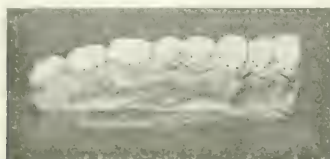
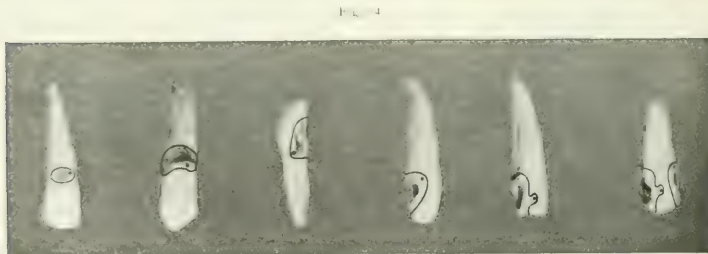
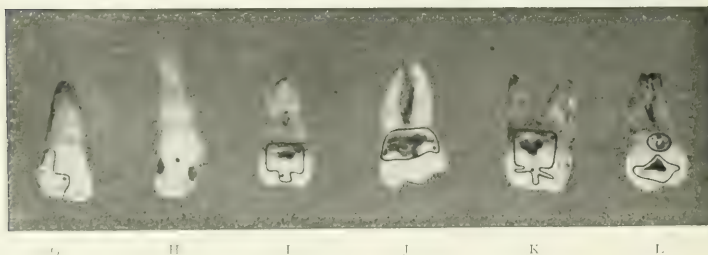


Fig. 3—A and B:



1. 4



ANESTHETICS USED

As such a small amount of the anesthetic actually enters the pulp—one-sixth of a drop is the estimate—a two-percent solution of cocaine is perfectly safe. However, should the operator have an aversion to cocaine, the novocain-suprarenin tablets *E*, containing novocain 0.02 gram and suprarenin 0.00005 gram in a two-percent aqueous or normal salt solution, may be used. If through carelessness an overdose of the anesthetic is given, causing a strangulation from which the pulp does not recover, death of the pulp may be the result. But this contingency is as remote with the careful operator as that of the physician causing the death of a patient by an overdose of a drug. There is never any danger of having injected too much of the anesthetic if the dentin is still sensitive. This condition merely indicates the lack of a sufficient amount of the anesthetic.

the obtunder is possibly within the cavity itself, removing the soft decay about a millimeter from a pulp cornu, and making the pit at that point.

Sometimes the cervical point of injection is not practicable. In such a case make a pit over a cornu of the pulp on the morsal surface. Start the bur next to but not in the fissure through which the cavity is to be extended, directing the bur toward the cornu after reaching the dentin. The pit in this case also should be included in the finished cavity. The dots on the teeth in Fig. 3, A and B, indicate the different points at which the injection can best be made.

The simplest cavity and the easiest to obtund is the gingival cavity, notwithstanding the fact that such cavities are the most painful to prepare if the tooth is not desensitized. This type is shown in Fig. 4, A, B. In the upper

(Continued on Page 134.)

American Journal of Surgery

QUARTERLY SUPPLEMENT of ANESTHESIA and ANALGESIA

Surgery Publishing Co.

J. MacDONALD, Jr., M.D., President and Treasurer
92 WILLIAM STREET - NEW YORK, U. S. A.

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OCTOBER EDITORIALS. 1918

THE MEDICAL RESERVE CORPS: THE VOLUNTEER MEDICAL SERVICE CORPS AND RED CROSS.

If you are not yet doing your bit and your best and are qualified for active medico-military service, the Editor of the Supplement will be glad to co-operate with you in speeding-up your application for a commission in the Medical Reserve Corps.

If you are physically disabled, over-age, essential to public or institutional need or have dependents who cannot be left, the Volunteer Medical Service Corps offers you an opportunity for accomplishing something worth while in the present emergency. Write to Dr. John D. McLean, Acting-Secretary of the Central Governing Board, Council of National Defense, Washington, D. C., requesting a formal application blank. Fill it out with your special qualifications and cooperate in Winning the War.

Major A. Lambert has issued a call from Paris for medical men to enter the service of the Red Cross abroad. Only those disqualified for service in the Medical Reserve Corps are desired. If Red Cross work interests you write to Dr. A. E. Shepley, Medical Personnel Bureau, Red Cross Headquarters, Washington, D. C., and find out what you can do.

Should any difficulty arise in securing service the Editor will try and obviate it if you will let him know.

Accompany your application for active service with an endorsement from your Association of Anesthetists. The secretary will gladly send you one on request.—McM.

GIVING OF ANESTHETICS CONSTITUTES THE PRACTICE OF MEDICINE IN WEST VIRGINIA.

An opinion recently handed down by the Attorney General of West Virginia holds that the giving of anesthetics constitutes the practice of medicine and that no person, nurse or otherwise, can legally administer anesthetics, unless he or she is duly licensed to practice medicine. The vital portion of the opinion is as follows:

"Under the law, the right to administer drugs used in surgical anesthesia by a person not a licensed physician would not depend upon either the question of preparation by study or otherwise, or compensation or fees charged for service, but upon the question as to whether or not the administration of such drugs would constitute the 'practice of medicine and surgery' within the meaning of the statutory definition. Is the administration of the anesthetic preparatory to a surgical operation an integral part of the operation itself? I think it is. There are certain things preparatory to a surgical operation necessary to be done that can be trusted to nurses and attendants, which are really not a part of the operation itself, and require no great amount of skill to perform. However, an anesthetic is a substance, the unskilful handling of which is dangerous to human life. The person undergoing the operation places himself absolutely under the control of the person administering the anesthetic. This is the first dangerous step in the operation; the first one requiring peculiar skill and knowledge. The operating surgeon concentrates his attention on the cutting part of the operation and cannot well exercise careful supervision over the person administering the anesthetic. The anesthetic is such a subtle and dangerous agent that the most careful supervision on the part of the operating physician does not remove the danger of the anesthetic in the hands of an unskilful person.

"If it is held that the administration of anesthetics does not constitute the 'practice of medicine and surgery, then the fitness of a person to administer them is determined in each case by the operating surgeon. He would constitute the examining tribunal and might choose either a skilled or unskilled person to perform a recognized dangerous part of the operation. I do not believe the legislature ever intended that any person not a

It would seem that it should be permitted to administer drugs used in such an anesthesia even though such person was not under the direction and in the presence of a licensed physician and surgeon."

From this opinion it appears that under no circumstances can any person, whether trained nurse or otherwise, administer an anesthetic during a surgical operation unless such person has received a license entitling him or her to practice medicine and surgery.

HIGH PRESSURE ANESTHESIA FOR CAVITY PREPARATION.

(Continued from page 132.)

lateral, A, the affected area probably would not extend to the gum. This would allow sufficient space for the injection to be made at a point between the cavity and the gum margin. As the enamel is quite thin at this point, precaution should be taken not to go too deep with the No. 1 bur before the first injection, as the dentin is readily reached and pain would be caused. In the case of the upper canine, B, the decay would generally extend beneath the free margin of the gum, and it would be necessary to make the pit to the mesial, distal, or morsal of the carious portion. The lower right central, C, may best be obtunded at the labio-mesio-gingival angle.

SINGLE INJECTIONS FOR TWO CAVITIES.

When an approximal and a labial cavity occur in the same tooth, D, the injection for the labial cavity will suffice for both. It is always necessary to force the anesthetic into the pulp for any cavity unless the cavity is extremely small—less than pinhead size, therefore at least the crown of the tooth should be anesthetized, and any number of cavities in it may be prepared or the tooth prepared for crown painlessly. It is usually most convenient to use the obtunder directly over the pulp on the lingual surface when it is deemed advisable to prepare an L cavity or make a lingual retention, E, F. Where there is a large cavity and exposure of the pulp, high-pressure anesthesia is not indicated, and the ordinary hand-pressure anesthesia method should be employed. Considerable cutting is usually necessary to prepare a cavity for a filling or an inlay where a corner of a crown is broken off, G, particularly if the morsal surface is well worn and the bit is short. A very secure anchorage is necessary in such a case, for the reason that in these cases much stress will be brought to bear on the filling in the mastication of food. Much cutting means much pain, but the pain is easily eliminated by the use of the high-pressure syringe.

In a badly disintegrated tooth, H, either a crown or filling may be indicated. If the pulp is found vital—and always ascertain whether or not it is devitalized—and a crown is indicated, the point selected for anesthetizing should be on the labial surface; but if fillings are indicated, the pit should be at the mesio-labio-gingival angle, the disto-labio-gingival angle, or on the lingual surface over the cingulum. In the case of a bicuspid or molar having an approximo-occlusal cavity, I, K, the needle is best inserted close to the gingival line adjacent to the infected area. If this point be difficult to reach, the morsal surface may be chosen. There is no unnecessary waste of tooth structure if Black's extension for prevention principles are conscientiously followed.

Lastly, in the case of a carious molar, in which there is both a morsal and a buccal cavity, L, it is another case of "two birds with one stone," and one injection on the buccal surface as indicated is sufficient to desensitize the tooth for the preparation of both cavities.—*Dental Cosmos*.

ANESTHESIA IN WAR SURGERY

ANESTHETICS IN MILITARY HOSPITALS.

THOMAS CLARKE, M. R. C. S., L. R. C. P. (Lond.)

Temporary Lieutenant R. A. M. C.

Anesthetist to the Lord Derby War Hospital and the Victoria Hospital, Burnley.

Having now been administering anesthetics for several years in hospital and private practice and daily for the last seven months at the Lord Derby War Hospital, Warington, with 3000 beds in the summer and 2,500 in winter, the following is my experience:

The patient is given as a preliminary morphin $\frac{1}{4}$ grain, atropin $\frac{1}{150}$ grain, half an hour before the operation. The preliminary injection of morphin and atropin is not only followed by less secretion of mucus and a quieter anesthesia, but the patient usually sleeps for an hour or two after the operation, thus causing very much less trouble to the nursing staff—a great advantage in a busy hospital.

The anesthetic mostly used by me is ether, preceded by chloroform. I use two separate masks, one covered with a layer of lint for chloroform and the other with two layers of lint for ether. By using two separate masks the danger of giving a mixture of unknown strength is avoided, and I almost invariably use the open ether drop method on a Schimmelbush's mask.

At the beginning of the administration I drop about one drachm of chloroform slowly on the mask, holding it an inch or so from the patient's face and quietly talking to him, or in nervous cases getting him to count. During this time the mask is lowered, until in about a minute or so it is resting on the face. I then replace it by the ether mask and quickly drop on ether till the lint is saturated. Next I place a towel, two or three folds, over the mask to increase the concentration, leaving sufficient space to apply the anesthetic continuously. By this method I rarely get any struggling and often not the slightest movement on the part of the patient, who is generally ready for the operator in three or four minutes. This ensures the maximum degree of safety, is certainly very quick, and preferable to beginning with ether alone. Patients all agree that the chloroform is pleasanter and less irritating. For instance, it is quite the rule for those men who have had both anesthetics to tell me that they prefer chloroform. The average quantity of anesthetic for an operation of half an hour is 2 drachms of chloroform, 3 oz. of ether. Occasionally it is very difficult to keep some of these young subjects under with the ether drop method alone, especially in abdominal cases, and it may be necessary to resort to a little chloroform or C. E. mixture for a short time and then resume the ether.

In my private and previous hospital experience I have administered nearly three thousand anesthetics, the bulk by the method outlined, and have not had one fatal case or any serious difficulty.

In my early days I was taught to give ether by the Clover method, but now rarely use it, for to my mind the ether drop method is very much better, in that the patients very rarely get cyanosed, have less trouble with mucus, a quieter anesthesia, and less sickness after the operation.

I have also introduced a Shipway's warm ether apparatus, and, in conjunction with my own methods, find it very useful in cases requiring prolonged administration, in that it conserves the body heat of the patient, and is also a saving of the anesthetic.

Ethyl chlorid and nitrous oxid have proved quite satisfactory for patients requiring a short anesthesia such as for incisions and manipulation of joints.

I find, after giving anesthetics daily in a military hospital, that it is quite different from administering them in a general hospital in peace. In the latter it is the exception to have a strong, healthy young man to anesthetize, the majority of cases being women and children or men usually with a definite organic or inflammatory lesion and often well prepared for an operation. Military cases are frequently robust young men who have lived an outdoor life for varying periods and many of them have been in the trenches and subject to war strain and nervous exhaustion. I have also found that men suffering from shell shock require much more anesthetic than other men and have a greater tendency to excitement whilst going under. In these cases a little encouraging suggestion during the first stage of anesthesia not only helps during the administration, but is also beneficial afterwards. At first I was inclined to attribute this to the mode of living, which made them difficult to anesthetize, but I am now convinced there is a nervous element to contend with. It is impossible in many cases to judge by the appearance of the men how they are likely to behave under an anesthetic. Some of the apparently quiet and sickly-looking men take a large quantity of anesthetic and become troublesome with excitement, whereas some of the rough-looking and vigorous need very little.

SPINAL ANESTHESIA IN WAR SURGERY.

Meuriot and Platon expatiate on the advantages of the spinal technic in operating on the legs and especially on the pelvis when the patient has to lie face downward. The war has led to the adoption of this technic more and more; Pauchet now has a record of over 2,000 operations done with spinal anesthesia, and they prefer the latter for all operations below the tenth pair of dorsal nerves. There is no vomiting with it, as they apply it, and no period of agitation as the patient rouses. The latter feature is particularly advantageous when a cast has to be applied and we have to wait for the plaster to set. Of course the anesthetic is a poison, and those whose liver and kidneys show that they are unable to counteract the toxic effect of the anesthetic should be excluded from spinal anesthesia. The wounded in war, however, are generally young and in good health, and hence evidence of toxic action from the anesthetic is very rare. They encountered it only in three of their 240 cases, and the manifestations were slight and transient. Two in this group of three were officers over 50, and the other showed signs of insufficiency on the part of the liver. In peace times, little attention was paid to insufficiency of the liver and kidneys as contraindicating spinal anesthesia and this explains the dissatisfaction with it. In operations on women soon after and during pregnancy and in persons over 50 the liver is apt to be below par. Even with the healthy young men of the army there are liable to be symptoms showing secondary excessive pressure (vertigo and headache) or indicating slight toxic action on the bulb (cold sweat, vomiting, syncope). But it is possible to ward off all this by care to withdraw enough of the cerebrospinal fluid to reduce the pressure. This may be estimated without an instrument of precision, but with the manometer it can be accurately determined, and the spinal anesthesia can proceed without fear of hypertension. They always make the injection with the patient seated, and they wait for three or four minutes before they let him recline, thus giving the anesthetic time to settle on the lower roots, and when he reclines they keep the head and shoulders raised on pillows to prevent diffusion of the drug to the brain. They always use the same solution, 0.07 gm. stovain in 2 c.c. of artificial serum, and draw 1 or 2 c.c. of the spinal fluid into the syringe and mix it well until the stovain acts on the albumin in the spinal fluid, as showed by slight turbidity.—(*Jour. A. M. A.*, Feb. 23, 1918.)

Leclerc says procain spinal anesthesia has three advantages: (1) it facilitates the change of the patient's position on the operating table and easily permits abdominal decubitus; (2) there is preservation of the laryngeal reflex which prevents asphyxia and postoperative bronchopneumonia; (3) in parotomies it avoids the thrust of abdominal viscera; (4) diminution or suppression of operative shock is the principal advantage.

The disadvantages are: (1) for some reason or other

there may be a complete failure to effect anesthesia; this is, however, very rare; (2) the anesthesia may be insufficient as regards intensity or duration or extent of field.

To justly appreciate lumbar anesthesia and the importance of the checks to which it is subject, it is necessary to carefully consider the dosage employed, the operative technic, and the points of injection, and the region in which the operation is to be done. As regards dosage the author employs three categories, i.e., less than 10 cc., 10 cc., and from 10 to 15 cc., the latter figure representing the maximum used; but the efficacy of anesthesia does not depend on the strength of the dose, as experience has shown that in some cases the stronger the dose the greater the proportion of failures.

The site of injection is the first or fifth lumbar space. The author uses both equally well. The higher level not effected by anesthesia differs for each patient and is not in agreement with the quantity injected. The most suitable level for spinal anesthesia seems to be the first lumbar or the twelfth dorsal space.

As complications, there may be slight nausea or vomiting or headache. In one case there was deafness and labyrinthine phenomena; in 6 cases rachialgia and meningitis; in 2 cases some strabismus. All these disappeared in the course of time.

Spinal procain anesthesia, though not a method of absolute security, renders great service, especially in cases of shock and wounds of certain regions.—(*Lyons Chir.* p. 497, 1917.)

LUMBAR ANESTHESIA IN THE TREATMENT OF SCIATICA IN MILITARY HOSPITALS.

Mancini remarks that the conditions at the advanced front amply explain the large number of cases of sciatica that are found constantly in the military hospitals. Treatment is mainly restricted to local injection of phenol, baths and electricity but the disturbances soon return as a rule after any or all of these. He has obtained much better and more durable results by inducing lumbar anesthesia. He injects 12 or 15 cc. of a 5 per cent. solution of procain, introducing the needle in the third or fourth lumbar intervertebral space. The relief of pain is immediate and complete. The anesthesia lasts from forty-five minutes to two hours. This brings the anesthetic into direct contact with the roots of the injured nerves, as well as with their connections with the spinal cord. The relief from pain is more complete and more durable than when the anesthetic is injected into the spinal cavity. The anesthetic seems to have a favorable action likewise on motor and trophic disturbances. He has applied this treatment in pure sciatica and also in cases of pain in the sciatic and ischium region from disease or injury by a projectile. Of course the benefit is durable only in the absence of anatomic lesions along the sensory nerve, but even these seem to be favorably modified to a certain extent. Any anesthetic might do, but procain or its equivalents have certain advantages. He adds a minute quantity of epinephrin to the anesthetic. In one case he injected by mistake nearly twice the intended dose of the anesthetic, but no harm resulted.—(*Riforma Medica*, June 1, 1918.)

Book Reviews

Local and Regional Anesthesia, Including Analgesia.

By CARROLL W. ALLEN, M.D., of Tulane University, New Orleans, with an Introduction by RUDOLPH MATAS, M.D. Second Edition, Reset. Octavo of 674 pages, with 260 illustrations. W. B. SAUNDERS COMPANY, Philadelphia and London, 1918. Cloth, \$6.50 net.

During the three years that have elapsed since the appearance of the first edition of Allen's monumental work on Local and Regional Anesthesia, considerable improvement and progress have been made in the field of painless surgery.

With a general broadening of this field, many additional

of methods of local and regional anesthesia. Notable among these additions is the removal of the prostate, a subject but briefly touched on in the first edition, and more recently considered in detail in the American Year Book of Anesthesia and Analgesia (1915-16), and now comprehensively considered. Allen regards the removal of the prostate as his best accomplishment in local anesthesia, largely on account of the great reduction in mortality and the ease by which the operation is done under the perfected technic of local anesthesia.

This second edition presents a great deal of new matter regarding sacral anesthesia which is coming into its own as a very valuable method of obtunding the pelvic areas. Hertzler, Lewis, Lynch and others have given great impetus to its use and it has been found very satisfactory. Many practical additions to technic for abdominal surgery are also included.

Cushing, after his experience at the front, has concluded that local anesthesia is the preferable method for all operations on the head and brain. Consequently, the progress collated by Allen in the chapter on local anesthesia for operations on the head will be found very useful.

So much has also been accomplished in perfecting spinal anesthesia that Allen has rewritten this chapter in line with the results of recent researches and clinical achievements.

In the preface to his second edition Allen remarks very pertinently: "Every change is not always a reform, and apparent triumph is not always progress. There is often work that must be done without enthusiasm, work that brings unrelieved weariness and a plodding gait, but the direct value of what we do is that we are working in the direction of progress. This has been my inspiration, and with these thoughts in mind I send this edition to press."

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AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

NOVEMBER, 1918

No. 11

CALCULUS OF THE PROSTATE.

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Prostatic concretions, or calculi, sometimes are seen. These occur in four forms: 1. A variety due to inspissation of the secretion of the prostatic follicles, in combination with the deposition of earthy salts—pseudo-calculi. These comprise the so-called corpora amylacea, first described by Morgagni in 1723. 2. Small calculi of urinary formation, which have formed in the kidneys or bladder and have become lodged in the prostatic urethra. 3. Calculi due to the deposition of urinary salts and muco-pus in some pathologic crypt or behind some obstruction of pathologic formation in the prostatic or bulbo-membranous urethra. Thus they occasionally are met with in deep stricture. 4. Phleboliths.

Concretions of the first variety are found in the prostate post-mortem although there were no symptoms referable to the organ during life. Minute concretions of this kind sometimes are found in the urine. They at first are of microscopic size, and in the majority of instances never attain sufficient dimensions to be of any practical importance. As seen with the microscope, they are small, ovoid bodies of a light-yellow tint and pearly luster. In the larger concretions the color is a dark orange. When first formed they are soft, but later on they become calcified and hard. They sometimes are similar to the concretions that form in the follicles of the tonsil and occasionally are coughed up by patients with chronic faucial disease. They sometimes resemble "young" gallstones. In elderly patients they may attain the size of a pea or larger, and may be very abundant. Thompson describes an instance in which several thousand of these concretions were visible microscopically. They are found in the secreting follicles and excretory ducts constituting the parenchyma of the prostate. The earthy material is deposited very slowly in concentric laminae, as is the case with phosphatic vesical calculi. The walls of several ducts and

follicles may be absorbed and form a single cavity, within which a number of such concretions may be found. When they become larger and the opening of the cavity containing them communicates freely with the prostatic urethra, the salts of the urine are deposited around them, and they become genuine prostatic calculi.

A case of true secondary prostatic calculus which came under my care is interesting both from the lack of symptoms which it primarily produced and the serious surgical complications which finally resulted.

M. B., stockman, aged 34. He had been perfectly well until four years previously, when his horse fell upon him, producing various injuries, the most severe of which apparently was a blow upon the perineum. This was followed by hematuria for one week. There was no urinary obstruction nor retention and ten days after the accident he was apparently as well as before. He remained well for six months, at the end of which time he noticed difficulty in micturition. The stream diminished in size, with frequent desire to micturate. This condition increased steadily. One year before consulting me he passed several small calculi. He had passed calculi at intervals ever since. At the time he first was examined the stream of urine was very small; there was considerable difficulty in evacuating the bladder; and he was having occasional chills, especially if the urethra was interfered with by instruments.

On examination a hard callous stricture was found in the bulbo-membranous region, with secondary cystitis. This was permeable with a No. 20 Charrière. Perineal section was advised and consented to. The operation, however, was deferred for a few days at the patient's request, preparatory treatment meanwhile being instituted. The patient chanced to come in contact with some physician who dissuaded him from submitting to the operation, telling him that he could be cured by medicine. The patient shortly afterward returned home after an alleged cure.

Eighteen months later the patient returned for examination. A large tumor now was found in the prostate, distinctly jutting into the rectum. This was of stony hardness and apparently im-

mobile. A diagnosis of secondary calculus embedded in the prostate was made. The patient could still micturate and the urethra was, as before permeable to 20 French. The stone could not be felt by urethral exploration. Operation again was proposed, it being my intention to perform a perineal section for the removal of the stone and division of the stricture. The patient again consented, but later refused to submit himself to the knife. I did secure a skiagraph of the stone. He again reported after some six months, when he was brought to my office by his physician who gave the following history:

Some three months after the patient last passed from under my care, suppurative occurred about the calculus and a secondary abscess formed in the pelvis, probably from an infection of the pelvic lymphatic glands. This was evacuated at the external inguinal ring, it having pointed through the inguinal canal on the right side. More than a pint of pus was evacuated and the abscess promptly healed. Pus shortly afterward formed around the calculus and the physician in charge considered it expedient to remove the calculus from the prostate by way of the perineum. For a short time afterward the patient apparently did well and for several weeks was passing his urine *per urethram*.

Later it was noticed that a pouch containing fluid had formed in the perineum. This was opened, a quantity of pus and decomposed urine being evacuated. The cavity not only did not heal, but thereafter mixed feces and urine were discharged through the perineal opening and also appeared at the meatus. Urination subsequently took place entirely by way of the perineum.

My findings were as follows: There was a large pouch in the perineum, communicating with the perineal wound; this was lined by pseudo-membrane and at its posterior extremity connected with the urethra. The perineal portion of the urethra was the site of a firm, callous stricture which extended from the middle of the perineum back to the bulbo-membranous junction. It had been impossible to pass the sound into the bladder since the last perineal operation. No attempt, however, was made to pass an instrument at this last examination. Feces and urine were discharging freely through the perineal wound and feces appeared at the meatus. On rectal exploration a fistula, approximately two inches in length and half an inch in width, was found in the anterior wall of the rectum. On inquiry it was learned that an attempt at a

plastic operation from the rectal aspect of the fistula had been attempted. This is important only as explaining to a certain extent the loss of tissue, the greater portion of which, however, had been lost by sloughing or ulceration after the perineal operation for the calculus.

An operation was proposed for the relief of the stricture and the repair of the rectum.

Operation.—An inverted V incision was made in the perineum as for prostatectomy. The stricture was divided and the urethra, prostate and rectum separated to a point about one inch above the upper angle of the fistula. This point corresponded very nearly with the prostatic-vesical junction. The dissection was accomplished with considerable difficulty, the urethra and bowel being firmly fused together by a cicatricial tissue. When the separation was effected, three good sized pockets were found about the neck of the bladder, representing the pouch formed by the pressure of the calculus and the destruction of the prostate and its environs by suppuration. A urethral sound now passed into the bladder was visible for the entire extent of the fistula on examination by the rectal speculum. Great difficulty was experienced in repairing the fistula in the rectum. The operation was very tedious, but I succeeded in closing the rent in the bowel with three superimposed lines of chromicized catgut. The two lines of suture first inserted were made continuous; the final line of suture was the ordinary Lembert. Especial effort was made in repairing the opening of the bowel to get as large a surface of denuded tissue as possible. When the suturing was complete a considerable buttress of freshened tissue covered the opening in the bowel. A fortunate circumstance of the suturing was the fact that the fistula was drawn to the right of the median line, thus lessening the chances of a re-establishment of continuity between the urethra and bowel. In several subsequent less extensive operations of a somewhat similar kind I deliberately displaced the line of suture laterally, as a systematic procedure. The callous stricture in the perineum was now cut away, leaving merely a strip of mucous membrane on the roof of the canal. When this portion of the operation was completed the floor of the urethra was entirely gone from the middle of the perineum to the prostatic-vesical junction, the internal sphincter vesicae alone being intact. No attempt was made to close the urethra by a plastic procedure. The sphincter having been thoroughly dilated

at the beginning of the operation, a large tube, wound with iodoform gauze, was inserted into the bowel to protect the repaired area from disturbance by gas and feces. The operation was completed by thoroughly packing with iodoform gauze the extensive cavity which now occupied the perineal body as far as the orifice of the bladder. A catheter was retained for twenty-four hours, after which time no attempt was made to divert the urine from the track of the wound. It was found that subsequent to removal of the catheter the packing in the perineum was so effective that the urine in great part at once began to flow through the normal channel. The first strips of gauze which were introduced into the wound were so closely applied to the line of union of the fistula as to protect it completely from such portion of the urine as might escape via the perineum.

The course of the case was very satisfactory. Both the perineal and the rectal wounds completely and promptly closed and the urine escaped entirely by the normal channel. There was no incontinence. No feces escaped at any time into the perineal wound. There was, however, an occasional escape of gas. This escaped slowly and in very small quantities, indicating that the opening which temporarily remained in the bowel was very small. No urine escaped by the rectum during healing. When last heard from the patient was well and daily riding about his ranch.

The calculus removed in the foregoing case weighed 720 grains. The rationale of its formation apparently was as follows: As a consequence of the traumatic stricture of the urethra, a certain quantity of residual urine continually remained in the canal. Decomposition followed, with the formation of secondary calculi. The obstruction to the outflow of urine meanwhile caused dilatation of the prostatic ducts. As the outflowing stream of urine during micturition came in contact with the obstruction afforded by the traumatic stricture, these small secondary calculi were forced against the latter and returned in the periphery of the stream. One of these calculi becoming lodged in a dilated prostatic duct, formed a nucleus around which laminae of phosphatic deposit occurred. This produced a rapid growth of the calculus, which growth continued until it attained the size noted.

Where the urine has access to the calculus bed,

triple phosphates deposit in successive laminae and may form a very large stone.

Chemically, prostatic calculi are composed chiefly of calcic phosphate and a small quantity of ammonio-magnesian phosphate. They never give rise to trouble unless they are exceptionally large, in which event they occasion a certain amount of mechanic disturbance and urinary obstruction. Small prostatic calculi often are discovered during rectal exploration of the prostate. They should not be disturbed even when their existence positively is known, unless they give rise to definite symptoms. Should they do so, they may be removed by perineal section—never by the rectal operation. In rare instances they may cause ulceration and abscess, and finally may be discharged into the urethra, bladder, perineum or rectum.

Prostatic concretions quite generally are believed to be characteristic of senility, but I have found them to be not infrequent in young subjects. Eastman has had a similar experience, finding them in very young subjects, and in twenty-two out of twenty-four prostates examined. Eastman held for the amyloid character of the corpora amylacea and claimed that they are largely of epithelial origin. He apparently showed that the laminated formation of these bodies is due to their origin in concentric rings of epithelium. In any event they almost certainly are of glandular origin.

Calculi often are found in the tissues about the prostate and neck of the bladder at some distance from the prostate proper. I have found them several inches above the vesical neck. It is my opinion that in some cases the peculiar bodies noted low down in radiographs taken of the ureters for the diagnosis of ureteral calculus, and which sometimes lead to diagnostic errors, are due to corpora amylacea in the vicinity of the ureters.

It is very easy to mistake calculi of the prostate for malignant or even tuberculous disease of the organ, hence one cannot go wrong in securing a radiograph in doubtful cases.

Calculi of the prostate sometimes are peculiarly associated with adenomatous enlargement. A case noted by H. A. Moore was a striking illustration.

Case II. Man, aged 68, farmer. No venereal history. Had been rising to urinate at night for several years. No serious symptoms and no examination until one year ago, when an abscess developed in his perineum secondarily in-

volving the left testis, which suppurated and ruptured through the scrotum. The perineal abscess was quite extensive and was opened and drained by his family physician. A severe "suppurative" cystitis developed. Fistulae resulted and persisted in the scrotum and perineum. When the case came under observation the urine was loaded with pus and there was complete retention, catheterization being required four or five times daily and at least twice at night. Analysis of the urine showed pus, colon bacilli, and staphylococci. The perineal and scrotal fistulae still persisted, the scrotum being firmly adherent to the left testicle. Rectal examination disclosed a characteristically bilateral enlargement of the prostate. A perineal prostaticectomy was performed, the right lobe of the prostate being found to be greatly enlarged and typically adenomatous. The left lobe was enlarged, apparently from simple chronic inflammation, the parenchyma being replaced by connective tissue hyperplasia. In the center of the left lobe was a distinct obsolete pus cavity containing secondary phosphatic calculi, averaging about the size of a buck shot. The parenchyma of the left lobe of the prostate had been destroyed by the pus infection, leaving a cavity surrounded by inflammatory tissue, which on rectal examination felt like the ordinary adenomatous enlargement of a lateral lobe. Probably the condition eventually would have resulted in a "cure" of the obstruction insofar as the enlarged lobes was a factor. At last accounts the case was progressing favorably.

A patient under the care of my associate, Dr. M. J. Latimer, presents an interesting illustration of prostatic calculus of renal origin.

Case III. Man, 35, millworker, first seen during an attack of renal colic. X-ray negative. Urinary findings, aside from slight flakiness, negative. Cystoscopy negative, with the exception of moderate edema and hyperemia of the right ureteral orifice. Ureteral catheterization showed normal urine coming from the left ureter. The flow was diminished and the urine flaky from the right. The right ureter offered an obstruction to the ureteral catheter about four inches above the ureteral orifice. A larger catheter was passed up to the point of obstruction, for the purpose of dilatation of the tube. Several attacks of severe colic recurred for a day or two. The pain then ceased suddenly and the stone was supposed to have passed, although it was not detected in the urine. One month

later, during which time there were no vesical or renal symptoms, acute retention suddenly developed. The sound elicited a grating as of from contact with a foreign body in the prostatic urethra. Prostatic-urethral calculus of renal origin was diagnosed. The stone was removed via the endoscope, under local anesthesia. The calculus weighed one gram and was of the typical mulberry shaped calcium oxalate variety. Complete relief of the symptoms resulted.

URETHRAL CALCULI.*

By CHARLES C. MAJES, M. D.,

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(Continued from the October issue.)

With further reference to the pathogenesis of calculi, a prominent editorial writer observes: Epstein demonstrated that urinary concretions are not simple conglomerations of crystals, but possess an organic framework of characteristic structure, the product of pathologic processes in the urinary tract, in which crystalline salts are imbedded and held together. Just what conditions are necessary for the production of this complex urinary deposit has not yet been determined, but Schade suggests a reasonable theory of urolithic formation. He says one of the fundamental errors in earlier consideration of this subject was that of regarding the urinary constituents as existing in simple watery solution. In the light of physico-chemical conceptions urine is more complex than this: it contains colloids including under normal conditions especially the pigments which greatly modify solution of the crystalloids. The colloidal substances exist in suspension and consequently present an enormous area having absorptive power for crystalloids which are in true solution. When a considerable amount of absorption occurs, there results at the surface of each colloidal particle a zone in which the crystalloids are more concentrated than elsewhere, and which serve as the starting point of crystallization whenever the solution becomes oversaturated. It is because of this absorptive power that colloids increase the solvent property of urine for uric acid, since the more of the slightly soluble uric acid withdrawn from the watery solution by absorption into colloidal particles the more (uric acid) can the urine dissolve. When the crystalloid goes out of solution it will therefore form crystals or precipitates which are intimately associated with the colloids. It is well known clinically that a calculus is less soluble than a simple crystalline mass of the same chemical nature, otherwise such a concretion could be dis-

solved by merely changing the reaction of the urine; but it is known that uratic calculi will persist in alkaline urine, and that oxalate calculi will remain in acid urine, without appreciable change. This insolubility Schade explains as also due to the colloidal matrix. If the calculi consisted merely of crystalline deposits they would dissolve readily, inasmuch as crystallization is a reversible process. Likewise, if the colloid were one that formed reversible precipitates or gels, as mucin which precipitates with acids and re-dissolves in alkalies, urinary calculi would be correspondingly soluble; but if the colloidal matrix is one that forms precipitates or gels that are not reversible, then re-solution of the calculus is difficult. Such a colloid is fibrin, and Schade was able to produce, experimentally, with calcium salts and fibrinogen, masses which became progressively harder and having the structural arrangement of matrix and crystals characteristic of calculi. Therefore, he urges the importance of inflammatory exudation in the formation of urinary calculi. Normal urine contains no irreversible colloids, hence does not form concretions; but inflammatory exudation introduces fibrinogen, and conditions become suitable for the formation of irreversible deposits of any crystalloid with which the urine may be saturated or oversaturated. Possibly other colloids may have the same property, but fibrinogen is the most important. "The solubility of concretions depends on entirely different laws from that of the simple crystalline deposits which never form concretions, yet hitherto we have attempted to find solvents for calculi on the basis of our experience with the solubility of simple crystalline formation, and have met with failure. Possibly a better understanding of the nature of calculus formation will help us toward the goal of solvent treatment." (J. A. M. A.)

According to Pedersen urethral lithiasis involves three basic factors: (a) metabolic disturbance of urinary excretion by which the chemical reaction and specific gravity are (occasionally without, but almost invariably with infection) so changed that precipitation occurs of salts normally held in solution, (b) disturbance in the hydraulics and physics of the act of micturition through natural variations in the urethral caliber, pathologic changes, anatomic or operative deformities, which favor urinary arrest, retention, decomposition and precipitation,* and (c) foreign bodies in the urethra which become nuclei

for urolithic formation through the excitation of the two factors already mentioned.

While it may be contrary to prevailing opinion, calculus formation within the urethral lumen seems extremely unlikely in the absence of urethrostenosis or an obstructive foreign substance. It is recognized that periurethral abscesses, fistulae, diverticula, and artificial mucosal openings inadvertently produced by unscientific instrumentation, may be prolific sources of calculous formation by furnishing by-paths for accumulation of residual urine; the occurrence of ammoniacal changes may thus favor deposition of urinary constituents without intervention of an actual obstructive lesion.

Of twenty-seven cases of urethral calculi observed by Britieff (1900 to 1909) in males, only two originated primarily in the urethral lumen. The concretions were composed of phosphates, and both were situated in congenital urethral diverticula. In another instance a paraurethral canal was present.

According to White and Martin, exceptionally, prosphatic calculi are formed within the urethral lumen; they usually descend from the kidney or bladder, and while phosphatic incrustation occurs they show uric acid nuclei. Their common site is in the bulbomembranous and prostatic regions, and in the navicular fossa. Calculi rarely form spontaneously within the urethral lumen behind a stricture, the urinary stagnation being insufficient to allow this. It is in urethral pouches or diverticula, or in suppurating blind cavities resulting from glandular inflammation complicating urethritis, that these formations most frequently occur.

Exceptionally, calculi may reside for many years within the urethral lumen, or in communicating diverticular cavities, without inducing symptoms indicative of their presence. Examples are recorded where such concretions were thus retained for fifty or more years, the patients ultimately perishing from unrelated pathology. Wolf mentions a male dying at the age of fifty from extensive hepatic cirrhosis, with local cellulitis, etc. Necropsy disclosed a urethral calculus measuring 4.6 x 3.3 cm. and weighing nearly twenty-four grams, situated 5 cm. posterior to the meatus urinarius within what was presumed to be a congenital diverticulum which also contained one hundred and thirty millet-seed concretions. The urethral lumen was crescentic in contour, overlying the diverticular area. There had been no urogenital symptoms during the life of the individual. Jawitzka records the existence of a calculus within the urethral lumen for thirty-five years without clinical discomfort: Puyette fourteen years, and Jesjakaw fifteen years. In the ma-

*The author says these two forms of disturbance might be called the primary pathology or pathogenesis of urethral lithiasis. While the results upon the tissues locally, after the calculus has formed or become impacted, might well be termed the secondary pathology or sequelae of urethral lithiasis.

majority of cases, however, more or less characteristic clinical manifestations are noted. In infants only subjective signs may be evident, i. e., urodynia, constant straining, and urinary "dribbling." Unless promptly relieved, urethral rupture with urinary extravasation and fatal urosepsis may be expected to supervene. In adults two distinct groups are recognized: (a) the acute, i. e., where the patient presents no history indicative of calculi until the urethral lumen becomes suddenly obstructed, with constant urodynia, uroschesis, etc., and (b) the chronic, i. e., where the patient has previously exhibited various urogenital disturbances, such as the so-called renal or ureteral colic, cystitis, pyuria, lithuresis, urodynia, urethrohemorrhagia, and finally complete uroschesis. Where the calculus is of sufficient size to produce complete obstruction to the urinary outflow, solution of continuity of the urethral interior with urinary extravasation is inevitable unless prompt relief be afforded by the institution of requisite surgical intervention. However, smaller concretions may sometime induce slight clinical discomfort, and may thus remain in situ for months or years, as already indicated.

According to Fowler, the symptoms induced by urethral calculi depend upon several factors, e. g., (a) the size and conformation of the concretion, (b) its situation within the urethral lumen, (c) its etiology, i. e., whether primary or secondary, and (d) the presence or absence of infection. Relatively large concretions may sometimes traverse the urethral lumen and be extruded *per vias naturales* in the absence of pathologic urethrostenosis; whereas smaller, rough and irregular calculi may induce severe urodynia and profuse urethrohemorrhagia. It must not be forgotten, however, that even small, smooth concretions lodging posterior to a "tight" urethral stricture may sometimes cause distressing and alarming symptoms. In young children sudden obstruction from a urethral calculus may induce most violent symptoms, and acute uroschesis is oftentimes noted. This is rare in adults excepting in association with pathologic urethrostenosis, there more frequently being rather sudden cessation of the urinary outflow, succeeded by "dribbling." Urethralgia is always a prominent factor and may be localized at the site of calculus lodgment, or referred to the anterior segment and glans penis. Reflex lumbar, abdominal and pelvic pains have been reported. Dysuria may be marked, and when the stone has lodged within the prostatic or membranous urethral lumen, or when associated with "tight" stricture, enuresis may be a distressing concomitant. When the stone becomes immovably fixed urethrohemorrhagia is usually slight. With

the advent of infection the symptoms become markedly aggravated, urodynia is greatly increased, and suppuration, abscess formation and fistulae are the most logical results. "A patient will tolerate a calculus in the urethra sometimes for years, being able to endure the discomfort to which it gives rise as a result of the mechanical irritation, but if infection occurs the symptoms become so severe as usually to require active intervention." (Fowler.)

The largest number of patients, says Pedersen, give a more or less definite history of recurrent or chronic and relapsing urinary disorders, punctuated with attacks of pyuria and hematuria, ureteral spasm, urocytic irritation, etc.; then comes a crisis which commonly marks the migration of the stone from the bladder and its arrest within the prostatic urethra; this is soon followed by dysuria, infection, prostatic pain, and more or less pain on defecation; a purulent urethral discharge is an important feature, requiring bacteriological investigation to distinguish it from Neisserian invasion. "Physical examination involves the use of the sound, urethroscope, cystoscope, rectal examination, bimanual examination with the sound in the urethra, etc." (Pedersen.)

The surgical treatment of urethral calculi may be adequately summarized in comparatively few words. Medical treatment is unavailing, there being no drug known which has a positive urolytic action. Obviously the exact anatomic situation and size of the concretion must be determined in advance of treatment by external palpation, by urethroscopy, and if necessary by roentgenoscopy. Of course, the primary indication is immediate surgical extraction of the offending foreign body, and there are several methods by which this desideratum may be successfully accomplished. However, many essential factors may necessitate modification of technical details incident to operative procedure, e. g., (a) the size and location of the concretion, (b) the duration and urgency of the clinical manifestations, (c) the physical status of the individual when first observed, and (e) the presence or absence of complications, such as infection, urinary extravasation, fistulae, abscesses, etc.

In the absence of complications or existing urethral pathology, lithectasy (literally lithoplastomy) under local anesthesia, if necessary, with or without meatotomy, is to be performed when the size and location of the stone will permit of its extraction by this simple procedure. Where lodgment has occurred within the urethral lumen distal to the peno-scrotal angle, urethrotomy is almost never indicated in the absence of complicating lesions. In such instances lithectasy is possible of successful

accomplishment, and should be the procedure of choice. To facilitate extraction, and to obviate infliction of inordinate mucosal damage, litholapaxy may occasionally be required, especially where the concretion is of considerable size, or has become markedly irregular in conformation during its residence within the urethral lumen. For this purpose so-called "mosquito" forceps, "alligator" forceps, or a small lithotrite may be safely employed, provided requisite care be exercised in manipulation.

Where the anatomic situation of the stone precludes extraction by the simpler methods mentioned, or in the presence of complications where immediate relief is imperatively demanded and temporizing with less heroic measures would enhance the clinical risk, external urethrotomy must be performed. Even in uncomplicated cases this method of procedure is usually indicated by the presence of an obstructing stone within the lumen of the so-called perineal urethral segment, i. e., the pars prostatica and pars membranacea. In the absence of complications the perineal incision may be safely closed without drainage; but in the presence of infection, abscesses, fistulae, urinary extravasation, etc., adequate drainage should always be instituted to prevent fatality from urosepsis. It must be remembered that where infection has already occurred, the following sequelae of external urethrotomy are to be feared: (a) failure of tissue repair, (b) a persisting suppurative sinus, (c) tissue disintegration, gangrene and sloughing, (d) the superposition of fatal sepsis. These dangers may be minimized by providing facilities for proper drainage. The clinical risks are correspondingly increased where urethral rupture and extensive urinary extravasation have already ensued prior to the institution of surgical treatment. The reminder seems hardly necessary that existing urethrostenosis should be overcome by appropriate measures when external urethrotomy is performed for extraction.

Investigation and personal inquiry have developed numerous examples of urethral stones in males observed by Louisville surgeons during the last few years. No cases in females discovered, although several such instances have been reported elsewhere, according to the literature. The details concerning some of the cases have appeared in the transactions of local medical organizations; others have not hitherto been published. Brief excerpts of the collected cases are appended.

(Sherrill). Male, fifty-five; chronic urocystitis; urodynia; lithuresis upon several occasions. When seen patient complained that "something came almost to meatus externus but could not be extruded

and passed backward in urethral lumen." Concretion not demonstrated by intra-urethral manipulation, cystoscopy, or urethroscopy; but palpation disclosed foreign body in deep urethra. Perineal incision; small urolithic fragment extracted. Two shell-like concretions imbedded in infiltrated tissue removed months afterward from urocyst supra-pubically. Patient finally perished from papillary carcinoma of the bladder. The author mentions several uncomplicated cases of urethral calculi where lithectasy was successfully executed.

(Bronner). Male, thirty-four; urodynia, pollakiuria. Palpation demonstrated large foreign body at peno-scrotal angle, verified by roentgenoscopy. Urethral calculus, successful extraction by external urethrotomy; urethral stricture divided at same time. Patient had been similarly operated upon one year previously and urethral stone removed.

(Ibid). Male, forty; urodynia several months, then lithuresis. Lithoplaty with forceps, stone located near meatus externus extracted without difficulty. Few days later second stone removed by lithectasia after dilating meatus. Patient had uroschisis on both occasions.

(Hall). Male, four years; urodynia, uroschisis twelve hours duration. Palpation revealed foreign body in deep urethra. External urethrotomy with extraction of stone which had formed around pin as nucleus. Mother stated child swallowed pin two years previously.

(Vance). Male, two years; partial obstruction of urethral lumen, much urinary extravasation into scrotum, abdominal wall and thigh. External urethrotomy, diverticular calculus deep urethra extracted without difficulty. Patient subsequently perished from pneumonia.

(Dugan). Male infant, aged four days; seemingly normal at birth, became restless and fretful; uroschisis, much straining; third day scrotal and penile edema. Urethral rupture, perineal incision, free escape of urine; flat scale-like rice-grain size calculus extracted. Drainage, no sloughing; kidney function apparently normal. Death in coma fifth day after birth.

(Ibid). Male infant, aged eight days; urination first two days, then dysuria and uroschisis. Vesical distention unrelieved by hot applications; fever, scrotal and penile edema. Urethral rupture, infection; perineal incision, escape of urine. Stone extracted from penile urethra. Continued suppuration. Death from shock or urosepsis.

(Ibid). Male infant, aged one month; dysuria began a few days after birth; uroschisis, then vesical distention. Stone immovably fixed in penile urethra distal to bulb recognized by palpation. Extraction by external urethrotomy.

(Ibid). Male infant, aged eighteen months; dysuria, uroschisis; tremendous vesical distention with fever two days duration. Immovable foreign body deep urethra noted palpation. Perineal incision, extraction difficult; calculus uric acid nucleus, phosphatic incrustation. Perineal incision left open; instrumentation to prevent traumatic stenosis. Eight months later symptoms recurred; larger con-

cretion removed from prostatic urethra with scoop through perineal incision.*

(Wathen). Four operations, same patient. First, at age of thirty months for removal of vesical and urethral calculi; fistula persisted several years. Second, at twelve years, extraction of stone from perineum which apparently originated in fistulous tract. Third, several years afterward, two additional concretions removed from perineum. Fourth (by Wathen), one year later, one stone removed from membranous urethra, another larger from urocyct. Patient now forty, roentgenoscopy shows no further urinary concretions.

(Peak). Male, age not stated; foreign body recognized by rectal palpation. Suprapubic cystotomy, funnel-shaped stone one and a half inches long, larger portion extended into bladder; successful extraction. Patient had been operated upon several times by other surgeons for multiple urethral strictures.

(Asman). Male, thirty-six; severe attack so-called renal or ureteral colic. Four days later dysuria, then uroschisis; while being prepared for roentgenoscopy patient expelled stone from meatus externus; subsidence of symptoms. No concretions demonstrated by subsequent roentgenoscopy.

(Abell). Male, thirty; symptoms of renal or ureteral lithiasis. Roentgenoscopy, two large calculi shown in left ureter at pelvic brim. Severe pyelonephritis, chills, fever; patient "felt stone pass into urethra." Litholapaxy, extraction with alligator forceps. Symptoms continued; second stone migrated to urethra from which it was extracted with forceps. Another similar case is mentioned by the author, but no details furnished.

(Hendon). Male, sixty-three; chronic dysuria, tenesmus vesicae, finally uroschisis. Urethroscopy, stone detected in membranous urethra; extraction by external urethrotomy.

(Spalding). Male, five; urinary symptoms since shortly after birth; increased urodynia, finally uroschisis. Calculus in membranous urethra discovered by introduction of sound; removal by perineal incision.

(Windell). Male, forty-two; acute uroschisis. Urethroscopy, large stone in deep urethra, verified by roentgenoscopy. Lithoplatomy impossible; extraction by external urethrotomy. Six vesical calculi subsequently removed, at various times, by perineal incision and suprapubic cystotomy.

(Ibid.). Male, fifty; no urinary symptoms until night before observation; acute urodynia and uroschisis. Stone in fossa navicularis disclosed by palpation and inspection. Meatus small, considerable force required in extraction by forceps.

(Ibid.). Male, forty-five; urogenital symptoms long duration; acute exacerbation, urodynia, uroschisis. Stone not discovered by roentgenoscopy, but characteristic "click" noted deep urethra on

introduction of urethroscope. Immediately after withdrawal of instrument, patient expressed desire to micturate when calculus expelled spontaneously.

(Ibid.). Male, thirty; dysuria, pyuria, tenesmus vesicae, chronic urethritis, oxaluria. Cystoscopy, small stone discovered in bas-fond. When patient returned two weeks later external palpation disclosed concretion in pendulous urethra; extraction by lithoplatomy and manipulation.

(McMurtry). Male, thirty-six; dysuria, partial uroschisis. Urethroscopy, calculus detected four inches from meatus. Lithoplatomy successfully executed. The author mentions two similar cases without further data.

(Grant). The author speaks of three instances in which he successfully extracted small urethral stones (lithoplatomy) with forceps. Dysuria, but in no instance complete uroschisis. No additional data furnished.

(Willmoth). Male infant, aged five days; dysuria, straining, uroschisis. Palpation showed foreign body impacted in penile urethra; stone three times size of cherry-seed two inches from meatus split and extracted (lithoplatomy) with mosquito forceps.

(Frank). Male, thirty; urethral rupture, urinary infiltration; concretion peno-scrotal juncture 3/8 inch diameter. External urethrotomy, stone extracted through fistulous opening.

(Ibid.). Male, forty-nine; dysuria, pollakiuria; constant pain in gland penis; stone 1/4 inch diameter fossa navicularis, oxalate of calcium; extraction with forceps.

(Ibid.). Male, thirty; acute uroschisis; bean-size calculus deep urethra; endoscopy, extraction with forceps.

(Ibid.). Male, forty-five; uroschisis; pea-size stone near distal end urethra; extraction after meatotomy.

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* It is exceedingly rare, whereas in adults they

TREATMENT OF STRICTURE OF THE
URETHRA.CHAS. W. BETHUNE, M.D.
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A stricture is a diminution of the normal dilatability of the urethral lumen due to a pathologic alteration of the mucosa. In other words scar tissue diminishes the normal calibre, forming an acquired stricture. A congenital stricture is a congenital narrowing of some portion of the lumen due to a structural defect and not to scar tissue, but these are rare.

The urethra except during urination, ejaculation or the passage of instruments is a collapsed tube whose lumen is its degree of dilatability without producing trauma. According to Oberlander, a stricture is present when any portion of the canal, excepting the meatus, will not easily admit a 23 French sound. This is a safe rule except in a patient whose genital organs are of the infantile type. Normal urethra will easily admit any instrument which can pass the meatus, naturally excepting cases of adenoma of the prostate, etc.

All acquired strictures are due to trauma, inflammatory, chemical, or mechanical. Inflammatory trauma is almost invariably prolonged or hypervirulent gonorrhea. Most gonorrheal strictures have an element of mechanical or chemical trauma in their etiology as well as the prolonged or severe inflammation. According to Oberlander, Finger, and other urologists, areas of round cell infiltration develop in the urethral mucosa during the course of a gonorrhea and in time either disappear entirely or leave monuments in the form of connective tissue, which if they encircle the entire lumen of the canal certainly form a stricture.

The gradual substitution of the modern treatment for the older, more or less drastic remedies, often of an irritating or caustic nature, and the quicker cures by less irritating drugs, of which the permanaganate irrigations were the first step in the right direction, have done much to place strictures among the uncommon diseases. Beyond a doubt stricture is gradually becoming less common. In my own practice with the total number of cases increasing yearly the number of new patients with stricture remains stationary.

The Otis urethrometer and the bulbous bougie have been the causes of many mistaken diagnoses. They suggest strictures the several normal diminutions of urethral calibre. The normal

tonic resistance of the external sphincter is often mistaken for a stricture by the bulbous bougie. The tip of an instrument lodging in the bulbar cul de sac is occasionally mistaken for a stricture, but this error is avoided by hugging the anterior urethral walls. In brief an urethra which admits a 24 French sound with ease is not strictured, assuming, of course, that there hasn't been a recent dilatation.

In 600 consecutive urologic patients about 400 of whom had gonorrhea, thirty-three with stricture were found. Syphilis is excluded in this series. Nineteen of these patients complained of difficult urination all of whom had filiform strictures, which did not allow the measure of their calibre with any degree of accuracy. The actual lumen of a filiform stricture is not necessarily extremely narrow, but may be so crooked and eccentric that only a filiform can find its way through. All of the strictures were at the bulbo membranous junction with the exception of one in the penile urethra. Six of the patients also had strictures in the bulbous urethra, two of which were filiform. Four had strictures of the scrotal urethra and six of the penile portion of the canal, three of them being filiform in calibre.

With the exception of acute gonorrheas, the urethras of all urologic patients should be explored for stricture. The best procedure is the passage of a 24 French or larger sound if this slips in easily it may be safely said that there is no stricture. Obstruction to the passage of the sound is not necessarily due to a stricture. The tip of the sound may catch in the bulbar cul de sac; a spasm of the external sphincter usually relaxes if the patient inspires deeply several times while the sound is pressing against it.

Adenoma of the prostate in which no false passage has been caused by injudicious instrumentation seldom resists the passage of a flexible coude tip instrument, even though a rigid one is obstructed. The age of the patient is to be considered in the diagnosis, together with the size of the prostate as noted by rectal palpation, although all adenomas do not betray themselves on the rectal surface and in these cases the cystoscope may be needed to clinch the diagnosis. Strictures rarely are complicated by adenoma of the prostate. Calculi, polypi, foreign bodies, extra-urethral growths, etc., may also obstruct the urethra and require differentiation.

The passage of small rigid instruments of calibre less than 15 French requires expert care lest they cause a false passage. If a tight

calibre may so bruise its orifice that it becomes impossible to pass a filiform for several days. When a tight stricture is encountered it is my custom to pass a whalebone filiform, and, if the first is obstructed, pack the urethra with a faggot of filiforms and try one after the other until one passes. If the bladder is dangerously distended and it is impossible to pass a filiform bougie, the bladder should be tapped suprapubically with a trochar or very large needle.

After the filiform has passed, a Gouley tunneled sound is threaded over the filiform and passed down the urethra very carefully so as to avoid the danger of cutting the filiform in two.

When a small tunneled sound has been through the stricture the battle is won unless the scar tissue is so tough that it absolutely defies further dilatation. If its calibre can be increased 5 French at the first or second sitting it can almost invariably be increased at each treatment until full calibre is reached.

It is my custom, when a calibre of 22 French is attained, to use the Kohlmann dilator, the blades being covered with a sterile rubber sheath. Dilatations should not be repeated more often than every third day and calibre should not be increased by more than 5 French at a sitting. After a calibre of 25-30 French is reached, depending on the average calibre of the individual canals, the intervals between treatments may be lengthened to seven or even ten days. Later the intervals may be lengthened to several months, as long as the urethra does not contract more than one or two numbers during the interval.

It is difficult to persuade a patient to continue his dilatations after a normal calibre has been attained. Of my series but four were seen after an interval of six or seven years; two had not recontracted, one recontracted two numbers and one who was very dissipated had retention and was later operated upon by another surgeon. Three others reported after an interval of three years and none of these showed recontraction.

This small series of private cases contains but two in whom operation was indicated all of the others being amenable to dilatation. The majority of cases seen in the hospital for operation presented such operative indications as:

1. Rupture of the urethra and extravasation of urine.
2. Stricture so tight or dense that the tun-

neled sound would not enter although the filiform passed.

3. After reaching a certain point it was impossible to increase the calibre further with the sound.

4. A resilient stricture, which recontracted after each dilatation.

5. Patients in whom dilatation caused intolerable pain. Under the first indication I have seen two patients; multiple incisions were made, a filiform passed and the classical external operation done on a guide; both recovered.

Eight came under the second indication for operation, two by divulsion with an Otis urethrotome threaded over a filiform. It may be mentioned here that it is unsafe to make an incision at the bulbo-membranous junction with the urethrotome because of the proximity of the prostatic plexus to the anterior urethral wall at this point; two cases of fatal hemorrhage from this cause have been reported by Fenwick and the injury confirmed by autopsy. Divulsion may be safely employed in these instances when the stricture readily yields on turning the screw, that is the stricture consists of but a few tense bands. In the more extensive and dense strictures of the bulbo membranous junction the classical external operation on a guide should be done and this was necessary in four patients, one of whom died of acidosis two weeks later. Two of this group had tight strictures in the penile region which were operated on by the Otis method of internal urethrotomy.

No cases were seen which could be classed under the third and fourth group.

To summarize, the majority of strictures are amenable to dilatation. The end results are fully as good following dilatation as after operation. In either case dilatations must be continued from time to time or recontraction will occur. Dilatation is almost devoid of danger while there will always be a small percentage of operative deaths.

INDIVIDUAL RESPONSIBILITY.

This war is to be won not by one man or one thousand men or one million men or one million people. It is to be won by the united efforts of the individuals of many nations. Every American citizen has an individual duty to perform, an individual share of the responsibility. The more powerful and effective the American forces are the shorter will be the war, and the shorter the war the fewer lives lost, the greater the number of American soldiers who will return home victorious.

CARCINOMA OF THE COLON: REPORT OF A CASE INCLUDING A BRIEF LITERARY REVIEW.

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There is no subject of greater importance before the medical profession today than the treatment of carcinoma whatever may be the anatomic situation involved; and despite intensive study and constant clinical and experimental investigations by the ablest observers in the world, certain aspects of the "cancer problem" still defy definite solution. However, the pessimistic attitude prevailing a few decades ago has been supplanted by a marked degree of optimism due to earlier diagnosis and improvement in ultimate results from rational methods of surgical therapeutics.

Less than twenty years ago a prominent surgeon said: Cancer has been a constant subject of study in all ages and in all nations, but the mystery of its origin is yet unsolved, resistance to its progress has yet proved unsuccessful, and the symbolic crab continues to sink its claws slowly but relentlessly into the flesh of its victim. The disease at first local becomes regional and constitutional; recurring when removed, disseminating when left; undergoing degeneration, intractable ulceration, deep-spreading excavation, and is usually followed by cachexia and death. (McGuire).

It was remarked more recently that despite the "time, brains, energy and money" expended in attempted solution of the cancer problem, little progress has been made. While the researches of skilled investigators have unearthed some important facts relating to the character of malignant tumors, insofar as elucidation of the many obscure features surrounding this mysterious disease may be concerned, "the end is not yet even in sight."

"Unfortunately for humankind, the etiology of carcinoma still remains submerged in apparently hopeless obscurity; and, in advanced carcinoma involving certain anatomic situations, the disciple of Esculapius is today as helpless in the matter of treatment as were his ancient confreres. However, in the early stages, and in certain other localities, the percentage of permanent cures from radical treatment is now much greater than ever before in the surgical history of the affection."

According to Anderson the etiology of malignant growths seems to be a sphinx-like problem shrouded in the mysteries of by-gone centuries, and as silently defying elucidation as the riddle proposed by the sphinx which was sent by Hera—the Queen of the

Gods and sister and wife of Zeus—to punish the Thebans, without an Eodipus to solve the conundrum! Cancer, like the sphinx, devours anyone who becomes afflicted and who is unable to solve its mysteries; cancer sits silently through the ages like the sphinx on the Nile, the supreme mystery of all times. There is no more mysterious nor mortal disease afflicting the human race today than this insidious malady! (Anderson).

The hypotheses advanced to explain the origin of carcinoma are about as numerous as there are writers on the subject, but "something more tangible than the flimsy film of theoretical assumption is requisite for the elucidation of observed clinical phenomena accompanying pathologic lesions; and, although the admission is regrettable, the extent of present information concerning the etiology of carcinoma is embraced in the simple expression—theoretical assumption." It is worthy of note in passing, however, that the bacterial or parasitic hypothesis of the origin of carcinoma seems less fanciful than many others which have been accorded credence. "The theory of Park and Behla that cancer is an infectious disease due to a parasite belonging to the chytridæ, *i. e.*, a vegetable organism on the borderland of the vegetable and animal kingdoms, is considered by Hoeve to be the most plausible."

The utter failure of more recently formulated theories to explain the origin of carcinoma has caused "the oscillating pendulum of etiologic thought to gravitate in a backward direction; and the hypothesis advanced by Abernathy in 1816 that there must be a diseased (*i. e.*, cancerous) propensity of the constitution has been revived and is being given serious consideration. This literally signifies the presence of an unknown and intangible something circulating within the human organism conducing to neoplastic formation and without which the creation of carcinoma is impossible.

Nearly every text book in Christendom contains the emphatic statement that carcinoma is hereditary, and this is also emphasized in current medical literature. "The reminder seems pertinent that existing information anent the hereditary transmission of anatomic and pathologic, as well as mental and moral defects, is infinitely less tangible than that relating to the etiology of malignant neoplasms, which of course is an admission of total ignorance regarding both propositions; moreover, has not the significant fact been ignored that irrevocable substantiation of the assertion that any defect is actually hereditary must include positive proof that either the spermatozoon or the ovum (or both) was similarly defective when fructification occurred?"

And is it not an immutable embryologic law that ~~the contents of the large intestine are incapable of being~~ fructified?*

Neoplastic formations were attributed by ancient writers to the influence of evil spirits. Hippocrates contended that the human body contained four "humors,"—(a) blood, (b) phlegm, (c) black bile, and (d) yellow bile; and Galen believed neoplasms owed their origin to the accumulation of one or more of these "humors!" Over three thousand years ago the Egyptians were the subjects of pathologic neoplasms, a typical specimen of osteal sarcoma having been discovered in the remains of an ancient mummy. (Anderson). Biblical lore contains numerous indirect references to carcinoma (canker); and it is said the Papyrus Ebers (1550 B. C.) also accurately describes pathologic neoplasms.

According to Bland-Sutton as quoted by Sherrill ninety-eight of every one-hundred intestinal carcinomata have their origin in the large intestine; about seventy-five per cent. of these involve the rectum, ten the sigmoid flexure, and thirteen the cecum and remainder of the colon. Leube estimates that four-fifths of all carcinomata of the large intestine occur in the rectum, and one-fifth in the colon and sigmoid.

Colonic carcinoma may exist and remain undiscovered for months or years owing to the absence of indicative clinical symptoms. This fact may at least be partially explained upon anatomic and physiologic considerations. It has been shown that in its development the large intestine is formed on the left side of the spine and rotates around the superior mesenteric artery as an axis, the cecum being under the stomach at the third month of fetal life, then beneath the liver, finally reaching the right iliac fossa. Such rotation leads to the observation that all structures necessary to vitality of the organ are to be found in the inner leaf of its mesentery, the outer leaf is merely attached to the parietal peritoneum, the separation of which along the line of adhesion immediately mobilizes the colon without injury and greatly simplifies operations thereupon. It is noted that there is great variation in the length of the intestines (both large and small) the total varying from twelve to thirty-three feet, or from the short carnivorous to the herbivorous intestine. Metchnikoff emphasized the fact that the absorber of liquids is the colon, that the contents of the

small intestine after removal of ninety per cent. of the protein food value are delivered thereto in a liquid state. It is also shown that peristalsis unlike that continuous form observed in the small intestine, is sudden, active, and intermittent, occurring from two to possibly six times in twenty-four hours in the right colon whenever the absorption of liquids reduces the fecal mass to proper consistency. The lymphatics play little part in absorption; it is principally a filtration into the portal venous system for purification in the liver. Because of the septic character of the contents of the large intestine the lymphatics have been nearly eliminated from the mobile organ; they are few and inactive as compared with those of the small intestine, and practically may be considered as connected only with the outer surface. This observation is important and shows why intestinal malignant neoplasms may remain local for such long periods; thus autopsy findings in death from colonic carcinoma proved that the disease was still local in more than half the instances, death being due to obstruction, perforation, or peritonitis.*

Carcinoma of the gastro-enteric tract is particularly amenable to surgical treatment, and statistics show an increasing percentage of five-year cures following early thorough removal. Therefore, the importance of prompt recognition can scarcely be over-estimated. The reminder seems pertinent that early diagnosis is not always easy, and there are several reasons why intestinal neoplasms are not more promptly recognized: (a) many people suffer transitory abdominal distress, mild temporary colic, a feeling of "heaviness," so-called indigestion, dyspepsia, etc., and the symptoms disappear without medical aid; moreover, there is a tendency on the part of certain practitioners not to seriously consider mild gastro-enteric manifestations, (b) as a rule physical examination alone will not reveal colonic carcinoma in the early stages, (c) the erroneous idea entertained by the public and also uninformed physicians regarding the high cost of roentgenoscopic investigation.

Mayo claims that (in this country) because of increased knowledge concerning intestinal carcinoma and the fact that patients are now seen by the surgeon earlier than formerly there has been a gain of nearly fifty per cent. of operability; that in the Mayo clinic the former operability of fifty-three per cent. has advanced to seventy-one per cent. within a few years. "When we consider that the operative

has not overlooked nor is he unmindful of the value of the recent writer is indebted to an admirable paper by Dr. C. H. Mayo published in the *Long Island Medical Journal* for April, 1917, to whom it is desired full credit be extended with thanks for the privilege of excerpting the material.

*For many of the anatomic and physiologic data mentioned the writer is indebted to an admirable paper by Dr. C. H. Mayo published in the *Long Island Medical Journal* for April, 1917, to whom it is desired full credit be extended with thanks for the privilege of excerpting the material.

mortality is nearly fifty per cent. lower, that in cancer of the rectum five-year cures have increased from ten per cent. to thirty-five and one-half per cent. since 1900, and that in cancer of the right colon the five-year cures are now fifty-four per cent. including the natural death rate for period and age, we appreciate the enormous saving from death and from disease attended with so much suffering." The surgical technic of attacking carcinoma in every anatomic situation has been perfected to such degree that any future progress or improvement in its effectiveness must come through earlier recognition; and it is encouraging to note that patients with suspected intestinal carcinoma are now being referred to the surgeon before development of obstruction to the fecal outflow with its legend of woes.

According to Rowlands the usual history of colonic carcinoma is that of chronic partial obstruction terminating in stenosis, the symptoms developing much less rapidly than when the small intestine is involved. Abdominal pain becomes severe, sometimes sudden in onset and associated with collapse. Obstruction to the fecal outflow usually becomes complete, although there may be small discharges consisting of mucus and blood. The abdomen becomes greatly distended, not only in front but in the flanks, where there may be some dullness due to a large quantity of fluid in the colon. Vomiting is oftentimes only a late and terminal symptom. Chronic fecal obstruction must be differentiated from gall stones which may cause repeated attacks of cholecystitis accompanied by coprostasis; from subacute appendicitis with constipation; from an inflammatory lesion in colonic diverticulum. These latter affections are usually associated with local tenderness and rigidity with pyrexia, in contrast to the supple, non-tender abdomen and subnormal temperature of colonic obstruction. In these affections also cathartics and enemata are usually effective. Strangulated hernia, tuberculous or malignant stenosis of the small intestine, volvulus of the colon, impaction of choleliths or fecaliths in the pelvic colon, must all be considered in the diagnosis. In seventy per cent. of instances obstruction is below the splenic flexure and in some a tumor is palpable. Occasionally obstruction in the pelvic colon may cause cecal distension alone, therefore the exact location of the pathology is not always easy. Bimanual pelvic examination is sometimes of value, as is also the use of the sigmoidoscope.

Burke believes the symptoms of colonic carcinoma depend upon three definite pathologic factors: (a) stenosis, (b) the accompanying intestinal

"catarrh," and (c) mucosal ulceration or tumor extending to other intra-abdominal viscera. When stenosis is the single feature colonic carcinoma may exist without marked clinical evidence until acute symptoms supervene. When an anemic patient previously enjoying perfect health particularly as regards digestion suddenly with or without dietary indiscretion complains of colicky pain and borborygmus, with radiation of the pain toward the anus accompanied by rectal tenesmus and obstipation or diarrhea, notices great loss of weight and increasing muscular weakness, intestinal carcinoma should be immediately suspected; when the feces contain blood, mucus or pus the further suspicion of carcinoma is strengthened; and if in addition a tumor is detected in any part of the abdomen, with or without visible peristalsis or rigidity, a positive diagnosis of carcinoma may be assumed. The pain of intestinal carcinoma may be localized around the umbilicus or diffused throughout the abdomen. It occurs most frequently at the height of obstipation, but may sometimes be noted when defecation is fairly regular, and may be due to local peritonitis. The absence of colic therefore does not negative the diagnosis of possible intestinal carcinoma. Profuse hemorrhage seldom occurs, but small flecks of blood are frequent; "tarry stools" never occur in colonic carcinoma. The copious evacuations which occur in late stages of intestinal carcinoma are scarcely ever influenced by therapeutic measures directed against chronic intestinal "catarrh," such as the regulation of diet, the administration of opiates, etc. In carcinoma of the descending colon the symptoms may be referred to the rectum and bladder; and in otherwise obscure cases colonic carcinoma must be considered. Differential diagnosis between cecal carcinoma and appendicitis in elderly people may cause considerable speculation when there exist elevation of temperature and repeated chills as well as acute local pain. Differentiation between carcinoma and appendicitis in the aged depends more upon the previous history than the temperature. In differentiating carcinoma from cecal tuberculosis careful examination of both lung apices for healed tubercular lesions, the Diazo reaction, the finding of tubercle bacilli in the feces, and the positive von Pirquet test should guide the surgeon in the right direction. The chief causes of error in differential diagnosis of hepatic flexure carcinoma are gall bladder disease, liver and kidney neoplasms, and duodenal induration. Sigmoidal carcinoma where the early pain is referred to the urinary bladder and left testis may be confounded with nephrolithiasis, but the absence of pathologic

positive, negative, (hard), pus, etc. and negative x-ray findings as regards renal or ureteral calculi, would exclude so-called nephritic colic. Differential diagnosis between sigmoidal carcinoma and diverticulitis is difficult. In active sigmoidal diverticulitis there is always a palpable tumor, and muscular rigidity does not occur in carcinoma unless the peritoneal cavity is involved. Therefore a tumor appearing suddenly in a patient who has complained for a long period of recurring attacks of pain suggests an inflammatory lesion rather than carcinoma; if the tumor disappears and after a time returns an inflammatory lesion is almost positive. In carcinoma there is secondary anemia with great loss of weight and strength; in most cases of diverticulitis the patient is well-nourished and of normal color, frequently obese. In his admirable paper Burke presents the following conclusions;

(1) Early diagnosis in colonic carcinoma is the surest means to a surgical cure:

(2) In unexplained loss of weight and diminished muscular strength with secondary anemia in an adult above forty years, particularly if gastro-enteric symptoms are present, colonic carcinoma should be considered:

(3) Where a tumor is present in any of the "four corners" of the abdomen it is well to consider colonic carcinoma:

(4) When peritoneal friction sounds are heard over the tumor it speaks positively for its intra-peritoneal origin:

(5) In sudden profuse hemorrhage from the rectum the colon should be diligently investigated for carcinoma—particularly the sigmoid flexure:

(6) When an adult complains of colicky abdominal pain, particularly when accompanied by disturbance of intestinal function, colonic carcinoma should be considered as the probable cause:

(7) In suspected acute appendicitis in elderly people, cecal carcinoma must not be forgotten in diagnostic deliberations:

(8) Where there is the slightest suspicion of colonic derangement the x-ray should never be omitted in the examination:

(9) In suspected intestinal carcinoma careful x-ray examination should always be made.

Of forty cases of intestinal carcinoma recently reported by Erdmann the cecum was involved three times, the sigmoid eleven, recto-sigmoid thirteen, rectum eight, transverse colon three, and the perirectal tissues two. The youngest patient was twenty-six years old. In each case the disease was well advanced when the patient came under his observation. The failure in perfection of early

diagnosis is ascribed to modesty on part of patients in speaking of their ailments and to refusal to submit to examination. Another factor is the too readily eased conscience of the physician in not examining such patients, accepting the diagnosis of the individual or her family doctor as to the existence of piles, fissures, etc. Many also overlook the importance of careful anamnesis. The author admits that the early symptomatology is so vague and indefinite that diagnosis is difficult and rarely made. The earliest symptoms are borborygmus, cramps, colic, pain, mucus, blood and pus in the feces; alternating diarrhea and coprostasis; and a feeling of incomplete emptying of the intestinal tract after defecation. Later a painful spot is noted on pressure, evidence of a tumor, and finally obstruction. In such cases careful examination of the rectum should be made and an x-ray picture taken following a bismuth meal.

Case emphasizes the necessity for early diagnosis in colonic carcinoma which is comparatively rare and consequently seldom seen in routine roentgenoscopic examination of the colon. The greatest care should be exercised in every examination of the gastro-enteric tract to the end that as few diagnostic errors of omission as possible shall be made. According to this author the roentgen findings in intestinal carcinoma are as follows:

(1) Delay in the progress of a bismuth meal given by mouth varying from forty-eight hours to several days:

(2) Arrest in the progress of bismuth clysmas; the obstruction may be complete or may be overcome in a greater or less period, according to the degree of stenosis. Haenisch's technic for bismuth enteroclysis should be followed literally. It must be shown that incomplete filling distal to the obstruction is not due to insufficient pressure of the bismuth column or the presence of dried fecal masses:

(3) Dilatation of the colon on the proximal side of the lesion, which is evidence of serious obstruction when present. The colon may end at obstruction in a funnel-shaped process, or there may be irregular filling defects, characteristic of cauliflower carcinoma:

(4) There may be a palpable tumor coinciding with the filling defect, but its absence is unimportant, especially in early cases. Fecal accumulations are apt to be present on the proximal side of the obstruction and must not be confused with real tumors:

(5) Exaggerated and anti-peristalsis is believed to be a valuable sign in the diagnosis of serious obstruction. However, normal peristalsis which is

the prevailing movement of the cecum, ascending and right half of the transverse colon, must not be mistaken for exaggerated anti-peristalsis. Laxatives before examination increase anti-peristalsis, and the character of obstruction,—malignant or benign, organic or spastic,—cannot be determined by this phenomenon.

In the technic advocated by Case ordinary bismuth or barium may be employed. The barium sulphate must be known to be chemically pure; meal by mouth and enteroclysis should both be used; careful cleansing enemas should be given before examination. A roentgenoscopic table of the Haenisch type is essential for colon work. Attention is called to the necessity of adequate protection around the tube, to adjustable lead diaphragms, and to proper preparation of the eyes before fluoroscopic examination. The patient is placed supine; an ordinary rectal tube is introduced beyond the sphincter; the container is elevated two feet and the clysmata allowed to flow. The cecum should fill in three or four minutes if no obstruction is present. The progress of the clysmata is watched as it ascends the colon, and if any apparent abnormalities are found the examination should be later repeated and the findings verified.

Brown's method in gastro-enteric bismuth examination is substantially as follows: The patient is given one ounce of subcarbonate of bismuth eighteen hours before the examination, defecation being avoided if possible; and then another ounce thoroughly mixed in a glass of water is given either just before or synchronous with the examination. He prefers a fairly thick gruel of farina or oatmeal to water as a vehicle. The author discusses the relative value of the fluoroscope and the radiograph, giving the classical comparison. "The fluoroscopic method, the ability by its means to study the dynamics as it were of the gastro-enteric tract, to unfold before us its physiology as well as its anatomy, the possibility of noting under our eyes the effect of the respiratory movement, of the change in position, of various forms of treatment, mechanical, medical and otherwise,—all these have made it a diagnostic aid in the field. To expect one method to solve a problem of great difficulty is fundamentally wrong; very few fluoroscopic findings are absolutely diagnostic, individual interpretation of the picture presented varies definitely with the operator, as almost if not absolutely some of the pictures may be presented by different conditions."

Eisen believes by use of the opaque meal or enema in colon studies obstructions may be definitely lo-

cated, the degree ascertained and the cause oftentimes determined. He emphasizes the importance of careful and repeated examination of the entire tract; also the value of roentgen findings in determining proper surgical treatment. Roentgenoscopy suggests the proper location for gastro-enterostomy, the requisite loops for short-circuiting, and in gastric carcinoma it may show the futility of celiotomy.

In discussing the treatment of colonic carcinoma Erdmann says in far advanced cases it is palliative; this consists in proper catharsis, cleansing the colon from below, and a diet which forms no excess waste material. The high frequency current has been of value in several instances. Anodynes and local anesthetics are given as a last resort. The palliative operative treatment consists in various types of anastomoses or short-circuiting. Frequently the colonic lesion improves sufficiently after the operation to permit of successful excision. In radical treatment the author advises wide excision owing to the lymphatic and vascular arrangements. In cecal carcinoma the distal six to twelve inches of ileum should be removed; in the transverse colon excision should extend to either flexure with inspection of glands in the transverse meso-colon and pancreatic area. If metastasis be found in the liver radical excision is contra-indicated. Resection where obstruction exists should be performed in two or three stages as the mortality is less. After preliminary colostomy the intestine is relatively clean and a free vent is provided while the anastomosis is healing. Of the several methods of resection the author prefers the abdominal, especially in mid-rectal and recto-sigmoidal carcinomata.

It is suggested by Mayo that as the colon naturally harbors several varieties of bacteria, a considerable part of the intestinal movement is due to the growth and activity of some of them; and because of such bacteria there is an added danger of peritoneal sepsis in operating on the organ. The suture lines must be both gas- and water-tight; tension unrelieved on suture lines no matter how perfectly they may be constructed will cause them to give way to necrosis after two days of pressure. Fortunately tension seldom occurs, yet safety valves for immediate or secondary use in delivering gases are of great advantage when needed. Thus suture operations on left half of the transverse colon may be protected from gas pressure by appendicostomy; in removal of the right half the end of the transverse colon may be incorporated in closure of the abdominal incision projecting through the peritoneum into the muscle to be opened if necessary.

This is required in approximately twenty per cent. of instances. Bloodgood similarly places the end of the intestine into the abdominal incision after sigmoidal resection with lateral anastomosis. The same result is accomplished when tubes are passed high into the colon through the anus where they are maintained for several days. The author further remarks that very extensive operations are indicated if the disease is local, and it may be considered local if there is only contact involvement. If the neoplasm has become attached to the urinary bladder the attached portion of the viscus should be removed; if attached to the uterus hysterectomy should be performed. It may be necessary to remove one or two loops of small intestine, or (in the male) the prostate or seminal vesicles, to make the operation sufficiently thorough. On the other hand, if there are grafts at a distance on peritoneum or intestine, or if distant glandular involvement or metastatic implication of liver or other viscera, no radical operation should be attempted to relieve obstruction; if operation is undertaken it should be palliative only.

According to Duval, in the treatment of colonic carcinoma there are three methods in vogue: (a) intra-abdominal colectomy with immediate suture of the colon—called colectomy in one stage, (b) removal of the coil of colon from the abdominal cavity with or without the formation of a temporary anus in situ with extra-abdominal colectomy later—called colectomy in two stages, (c) colectomy with immediate formation of an anus in situ. Colectomy in three stages is really intra-abdominal colectomy preceded by the construction of an artificial anus above site of the neoplasm. It is believed each method has its special indications. Duval says it is unanimously agreed that so far as the cecum, the ascending colon, and even the hepatic flexure are concerned, resection should be completed at one operation. Where there is acute obstruction all authorities agree in making a fecal fistula, delaying colectomy until subsidence of acute symptoms. In carcinoma of the transverse colon and left colon uncomplicated by acute obstruction the indications depend on: (a) the clinical conditions, (b) the colonic pathology, and (c) the site of the lesion.

(1) Obesity, cardio-renal disease and chronic intoxication absolutely contra-indicate operation in one stage.

(2) When upper end of the colon is dilated, and especially when rigid, immediate suture is not indicated unless the two ends are practically equal in size, and unless the walls of the upper end are sufficiently pliable to permit of perfect approxima-

tion and suture; moreover, colectomy in one stage to be safe should be preceded by the establishment of an artificial anus which will allow the colon to be emptied and disinfected.

(3) Some surgeons believe colectomy in several stages should be performed on fixed and in one stage on mobile colons; but by performing coloparietal dissection one can immobilize the colon, excepting perhaps the splenic flexure, therefore this deduction would seem to hold good only when that region is implicated.

Rowlands observes that from an operative standpoint colonic carcinoma may be divided into general classes, i. e., those in which resection is hopeful, and those in which it is impracticable. When the neoplasm is movable and not invading any important viscus, and there is no evidence of secondary growth, resection may be considered hopeful. Three chief ways are open to the surgeon:

(1) Colostomy proximal to obstruction, preferably in the transverse colon: this is safer than short-circuiting in the presence of complete stenosis with intestinal paralysis;

(2) Short-circuiting is particularly applicable to the ileo-cecal region and does not interfere with subsequent resection; with complete obstruction it is less likely to conserve life than colostomy, otherwise it is cleaner and often renders subsequent resection easier;

(3) Resection with drainage in which the affected coil is brought outside, the neoplasm removed, and two Paul's tubes inserted; when the patient's condition is too grave to permit removal of the tumor a Paul's tube may be placed in the delivered loop proximal to the neoplasm and the latter removed subsequently; when there is no hope of resection, colostomy is to be avoided wherever possible and short-circuiting adopted instead.

Rotter reports one hundred and sixty cases of colonic carcinoma from 1893 to 1912, seventy-nine of which were operated upon radically, and eighty-one which could not be so operated upon, either because the neoplasm had so far advanced that it could not be completely removed or because the patient entered the hospital with ileus and perished as the result of operation therefor. He agrees with Korte, Petermann and Anschutz that if ileus is present the operation should be limited to creation of a fecal fistula, since the patients are so weak they cannot withstand more; but in Rotter's statistics even the relatively simple procedure of making a fecal fistula shows a mortality of forty-four per cent. Entero-anastomosis in ileus gives sixty per cent, and advancement and resection seventy

per cent. Results of radical operation were satisfactory where there was no ileus; of seventy-nine patients so operated upon fifteen died, or nineteen per cent. In carcinoma of the cecum and ascending colon the end of the ileum and the entire ascending colon were removed and the ileum implanted end-to-side or side-to-side into the transverse colon. In seventeen such operations the mortality was seven-per cent. The free end of the transverse colon was closed by continuous suture and invagination. In carcinoma at the middle of the transverse colon or below, Mikulicz' advancement was performed in some instances and primary resection with circular suture in others. In twenty-seven operations by Mikulicz' method in two stages the mortality was eighteen per cent.; while in twenty-one by circular suture six died. Circular suture is absolutely contraindicated by the presence of much intestinal fat, where the intestine is distended with feces, impossibility of complete immobilization, and suture without tension. In eleven cases in which the transverse colon was united to the descending colon end-to-side or side-to-side the mortality was ten per cent. Ileosigmoidostomy with exclusion of a segment of intestine was performed three times with good results where the ends could not be sutured without tension.

Maylard emphasizes the advisability of certain incisions and methods of intestinal anastomosis in colonic carcinoma. He advocates transverse incision in the mid- and upper abdomen, oblique in the lower. Vertical incisions are used only for diagnostic purposes. He prefers transverse and oblique incisions: (a) because they effect the greatest possible exposure, and (b) because they result in cicatrices which are least likely to weaken and cause herniæ. In tumor or stenosis of transverse colon incision extends across the abdomen one or two inches above the umbilicus, the recti muscles being divided if necessary. In carcinoma involving the hepatic or splenic flexure, or the ascending or descending colon, transverse incisions are made outward from points situated respectively above and to right or left of the umbilicus. The great advantage of these incisions lies in the anatomic fact that there is no cross division of muscle or aponeurotic fibers. In carcinoma of the cecum, lower part of ascending colon, lower descending colon, the iliac colon, or the pelvic colon, an oblique incision is best. The success in intestinal anastomosis depends upon two essential conditions: (a) the healthier the intestinal edges the more rapid and secure the union; it is largely because of the unhealthy state of these edges that failure so commonly ensues when anas-

tomosis is attempted in acute obstruction, (b) perfect coaptation of uninterrupted serous surfaces. The author prefers end-to-side anastomosis with invagination of proximal segment where excision does not interfere. As the great danger in colon anastomosis lies in the divided meso-colon with its lacteals and lymphatics serving as an atrium of infection, Maylard seeks to obviate this by his "invagination anastomosis." He further recommends forcible dilatation of the anus to allow expulsion of gas and thereby prevent strain on suture line of anastomosis.

Gruet refers to externalization of the colon and describes the techic of Guenu who holds that the tumor must be brought outside the abdominal wall, but the pedicle may remain inside the abdomen if it is outside the peritoneum:

(1) The first stage consists of extra-parietal externalization of the neoplasm, with extra-peritoneal externalization of the pedicle. After exploring and freeing the neoplasm the loop is externalized; the mesentery being "spread out" the peritoneal leaf of one of its surfaces is slightly incised and then dissected so far as possible passing well beyond the suspected zone, and the portion thus dissected is sutured to the parietal peritoneum. The same thing is done on the other side, and the abdominal wall closed above and below the externalized loop.

(2) In the second stage resection of the neoplasm is performed, followed by suture of the posterior semi-circumference of the ends of the intestine and suture of the two anterior semi-circumference in the skin wound; this is done about eight days after the first operation.

(3) In the third stage the artificial anus is closed by enterorrhaphy; this should not be done until the general health of the patient has improved. Guenu always performs this enterorrhaphy strictly outside the peritoneum.

Gruet's collection embraces one hundred and seventeen cases, seven of them being Guenu's which are mentioned in detail: (1) carcinoma of splenic flexure; death from hemorrhage eight days after closing artificial anus; (2) carcinoma of splenic flexure without closure of artificial anus; patient survived three years; (3) carcinoma of descending colon without closure of anus; recurrence in liver four and a half months after operation; (4) carcinoma of sigmoid; recurrence in true pelvis sixteen months later; (5) carcinoma at termination of sigmoid loop, no closure of anus; recovery; (6) no details; (7) sigmoidal carcinoma; patient in good health after six and a half years. The author concludes that externalization should only be performed in

carcinoma of the left colon, especially in feeble patients with vegetating septic neoplasms accompanied by lesions of wall of adjacent loop. Reybard's colectomy, or methods of colectomy in two stages, should be reserved for favorable cases of small movable tumors without marked lesions of adjacent loop, and for patients still in good general health. "Externalization is sometimes an operation of necessity, but more generally of prudence, and its indications should be extended where the surgeon is in doubt as to the condition of the intestinal walls."

CASE REPORT: J. M., male, aged thirty-five years, occupation pipe fitter; date of first observation April 8, 1917. Family history negative for tuberculosis and pathologic neoplasms. Patient denies syphilis, and has no objective signs; has always been healthy with the exception of what he described as "cramping in his bowels" since the age of eighteen. He states that he suffered with colicky attacks on the average of once a year, and formerly ascribed them to the ingestion of some particular article of diet, such as honey, tomatoes, pears, etc.

The present trouble emphatically asserted itself six months ago when he had several attacks of colicky pain associated with coprostasis. More or less complete relief followed the hypodermatic use of morphine and the internal administration of liberal doses of castor oil. About a month before the patient came under my care obstructive symptoms developed, such as gaseous abdominal distension, pain and general discomfort; but he said "he was not constipated as he was taking laxatives all the time!" During that month he was under the observation of two very able surgeons.

On April 8, 1917, Dr. J. J. Connolly was called in an emergency, the patient having developed acute symptoms. We saw him together a few hours later and had him removed to the hospital immediately. His temperature was then 100° F., pulse 80. He had a leucosytosis of 16,000 with ninety per cent. polymorphonuclears, which indicated pus formation plus lessened resistance and low vitality. Physical examination revealed a firm, slightly movable intra-abdominal tumor the size of a cocoanut to the right and on a level with the umbilicus. It appeared a little too high for the appendix and too low for the gall bladder, but from its location it might have involved either. The patient was anemic and presented a peculiar sallow color suggestive of malignancy. Röntgenoscopic examination of the abdominal area was negative for "gall bladder" shadows. The condition of the patient was too critical for barium test-meal reading of the alimentary tract,

which procedure at any time previously would certainly have clarified the diagnostic obscurity. Obstruction to the fecal outflow was not complete although he had vomited several times. The following day his pulse began to ascend and his temperature to recede, and it was decided the height of surgical wisdom to operate without further delay.

Celiotomy disclosed a large tumor encircling the transverse colon just distal to the hepatic flexure, which had perforated and formed a "walled off" abscess containing feces, gas and a considerable quantity of pus having the characteristic offensive colon bacillus odor. Adhesions were abundant everywhere, the gall bladder, duodenum and stomach being chiefly involved. The appendix was acutely inflamed and circumscribed peritonitis was manifest. While the case appeared entirely inoperable, we decided to remove the colon and abscess in toto, which was finally accomplished. The glands in the meso-colon were infiltrated, some of them being the size of hazelnuts. There were no metastases in the liver or lower abdomen, so it is probable the glandular enlargement was largely inflammatory in character. The involved glands were removed, together with the tumor which included the cecum, appendix, the ascending and more than two-thirds of the transverse colon. The ileum was united to the colon proximal to the splenic flexure by making an artificial ileo-colic valve according to the method of Kellogg. The raw surfaces were carefully covered and two large drains inserted.

As might have been expected the patient left the operating table in deep shock, but reacted to appropriate measures and has since progressed satisfactorily. The abdominal incision became slightly infected despite all precautions and the liberal use of iodine. The wound healed by granulation, and three weeks after operation the patient was able to walk about his room in the hospital. Nearly six months have now elapsed and the man has remained apparently well. I think the results thus far amply justified the extensive operative procedure, and the ultimate outcome will be watched with interest. In my opinion there are about three chances to one for recurrence. Several interesting phases are illustrated by the foregoing case report:

(1) It shows the length of time colonic carcinoma may exist and remain unrecognized. While this is usually the fault of the patient, in this particular instance the neoplasm was overlooked by at least one competent surgeon who, according to the history, treated the patient for "indigestion."

(2) It emphasizes the fact that in the majority of instances colonic carcinoma is discovered and

the diagnosis made only after the abdomen has been incised for acute fecal obstruction.

(3) It shows the serious complications which may ensue.

(4) Recovery of the patient from the operation vividly impresses one with the depth to which a human being with carcinoma may sink, and yet under adverse conditions withstand a grave surgical operation.

(5) In my opinion it would be a criminal offense at the present day to treat an individual for so-called indigestion, dyspepsia, etc., which may mean anything from mild gastro-enteric disturbance to pathology dangerous to the individual, such as appendicitis, cholecystitis, gastric or duodenal ulcer or carcinoma, intestinal carcinoma, etc., without giving the patient the advantage of careful roentgenoscopic examination of the entire alimentary tract. If there exists no serious pathology, the patient ought to know it; if a dangerous lesion is present we ought to know it for his benefit.

I am in perfect accord with the ideal arrangement perfected in one of our large cities where a group of expert specialists have established a diagnostic clinic; I believe this will be of great benefit to the people of that city and vicinity.

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FIELD MEDICAL SUPPLY DEPOT OF ARMY DESIRES TO PURCHASE ROTARY MICROTOMES.

The Field Medical Supply Depot of the Army is in great need of rotary microtomes for use in making pathologic examinations of lung tissue in differentiating bronchopneumonia from lobar pneumonia at the various camps. The Medical Department therefore requests any one having a microtome to dispose of to communicate with Lieut.-Col. M. A. Reasoner, M. C., N. A., Field Medical Supply Depot, U. S. Army, 21 M Street N. E., Washington, D. C. It is desired to purchase the microtomes since the safe return of any lent to the department could not be vouched for.

AN ADJUSTABLE SECTIONAL PLASTER OF PARIS SPLINT.

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While the plaster of Paris cast may possess many advantages as a dressing for fractures of the bones of the extremities, it has, at least, one inherent defect, viz: that the subsequent correction of faulty position of the fragments is impossible without the removal and the reapplication of the cast.

I think it will be conceded that, except in a simple transverse fracture, the maintenance of an accurate adaptation of the fragments to one another while the cast is being applied is not a simple procedure, as subsequent Roentgenoscopic

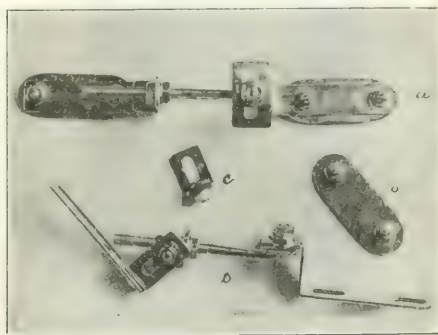


Figure 1. (a) Apparatus assembled, (b) (c) (d) Component parts.

examination shows varying degrees of faulty alignment, over-riding, or rotation to be the rule rather than the exception. Fractures apparently satisfactorily reduced and immobilized during the muscular relaxation of a general anesthetic may show an entirely different condition when examined after recovery from the anesthetic when complete muscle tonus or spasm is exerting its influence in the production of deformity.

Later on the tendency to fragment displacement increases as the efficiency of the cast as an immobilizing agent becomes lessened following the subsidence of the primary swelling and the shrinkage of the limb as a result of tissue atrophy.

To derive the most satisfactory results from any method of fracture dressing, the dressing (a) should not only be adaptable to the limb in any posture requisite to securing the greatest degree of relaxation of muscle groups whose contraction produces fragment displacement, but, (b) should also be capable of employment as a means



Figure 4. Same patient as in figure 1. Cast may be removed at any time without disturbing splint and Safford band.



Figure 5. End view of apparatus shown in figure 2.

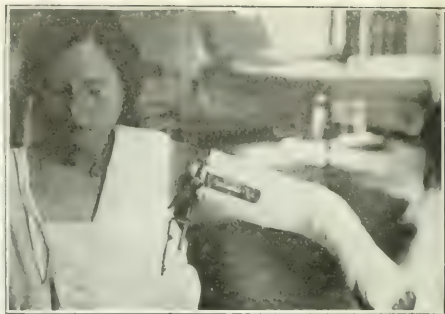


Figure 6. Fracture of Surgical neck of humerus.

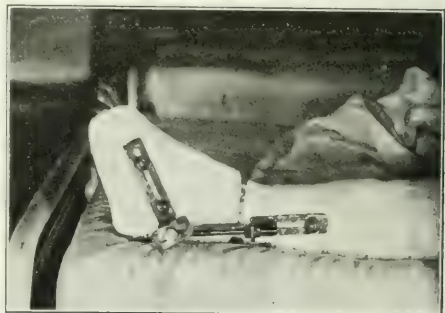


Figure 7. Supra malleolar fracture of Tibia and Tibula.



Figure 8. Same patient as in figure 1. Cast may be removed at any time without disturbing splint and Safford band.

of antagonizing the tendency to displacement not secured by posture, and, (c) should be capable of frequent modification to adapt it to the progressive changes of size and contour of the limb during the period of tissue atrophy.

It is chiefly in respect to the two last conditions, (b) and (c), that the one piece plaster cast,

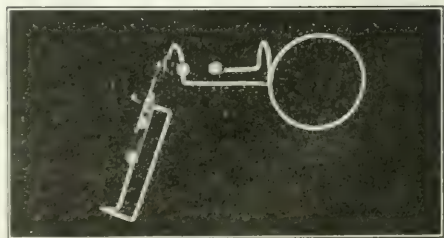
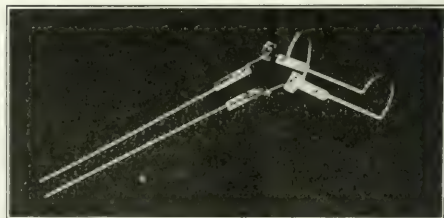


Figure 7 and 8. Wire splint for leg fracture adjustable angle and length.

due to its unalterable structure as customarily applied, fails to do all that could be desired in obtaining the best end results.

During the past year I have been able to demonstrate that it is possible to overcome some of shortcomings of the plaster cast by abandoning the one piece principle and by using instead a cast composed of two or more sections which are connected to one another by metallic bridges in such a manner that their relative position may be changed in any direction and secured in any position desired.

By having the space between sections correspond with a joint we are able to take advantage

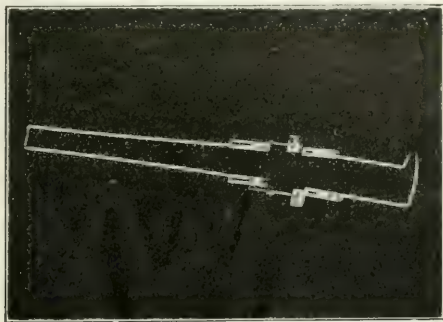


Figure 9. Wire splint for arm fracture adjustable angle and length.

of the movements of that joint in securing muscular relaxation by posture. Later on, when union is fairly well established in the fracture, one can commence daily alteration in the position of the joint and, in this way, combat somewhat the joint stiffness which follows prolonged immobilization.

By having the space between sections correspond with the site of fracture one is able, by altering in the proper direction the relation of one section to the other, to exert a force which antagonizes the muscular contraction which produces deformity by angulation in any plane, by shortening or by rotation. The only limit to the employment of this force is the production of pressure symptoms especially over bony prominences or over the heel in leg and thigh fractures.

This may be mitigated, to a large extent, by the judicious use of felt pads and, in thigh fractures, by the selection of the flexed leg and thigh posture, supplemented by adhesive plaster attached to the leg and incorporated in the distal section of the cast. In this manner the force utilized in extension is transmitted to the leg

through the medium of the adhesive straps and the foot is relieved of all pressure from the cast.

Tendency to pressure on the perineum is corrected by transferring the force to the pelvic portion of the cast by increasing the degree of the thigh flexion and by abduction of the thigh.

There are, of course, certain types of fracture

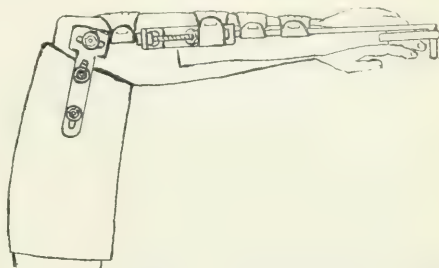


Figure 10. Combined wire and plaster sectional splint for fractures of forearm extension by plaster attached to lateral extension rods.

in which complete reduction and the maintenance of satisfactory fragment position is an impossibility without resource to operation and the use of some artificial fixation by bone graft or otherwise according to the individual preference of the operator.

This method of fracture dressing may be employed in conjunction with the above mentioned operative procedures for the purpose of immobilization and to relieve the artificial fixation from

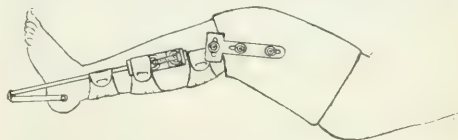


Figure 11. Combined wire and plaster sectional splint for fracture of the leg. Extension by Steinman pins through os calcis attached to side extension rods.

undue strain or displacement during the process of repair.

When applied to fractures of the lower extremities it may, if desired, be supplemented by some form of overhead suspension to add to the comfort of the patient and to facilitate nursing.

As this form of dressing is entirely independent of cumbersome accessories in the line of weights and pulleys for extension and counter extension one is able, in hospital practice, without danger of disturbing the fracture, to move the patient frequently to the x-Ray room for fluoroscopic examination and adjustment.

Under ordinary conditions it is preferable to make at least one reapplication of the cast. At

the time of the first application especial attention should be given to the location of the spaces between the sections that, by proper adjustment, one may be able to secure the fragments in proper relation to one another.

This dressing should remain on only until sufficient bony union has taken place; further correction is neither advisable or obtainable.

At the second application attention should be given to the location of the sections to permit joint mobilization and ambulatory treatment.

With the exception of fractures of the bones of the hands and feet there are no fractures of any bones of the extremities where this modified form of cast can not be applied when the use of a plaster cast is not contra-indicated.

In badly infected compound fractures requiring treatment by irrigation the apparatus can be used in connection with various forms of wire splints (Figs. 7, 8 and 9).

When the wound involves only a portion of an extremity one section of wire splint may be substituted for the plaster cast during the process of wound repair (Figs. 10 and 11).

DESCRIPTION OF APPARATUS.

This consists primarily of two different parts: one, a pair of thin steel plates with a bolt near each extremity which projects through the cast; the second, a steel bridge which by its method of construction permits movement in all directions and locks in any position. This bridge is slotted to permit the passage through it of the bolts protruding from the surface of the cast and to which it is secured by nuts clamping it firmly in position.

This furnishes an absolutely rigid attachment of the bridge to the cast as the plates lie within the cast and the bridge on the outer surface engaging a portion of the cast between opposing surfaces.

METHOD OF APPLICATION.

After the customary preliminary preparation of the limb, pads, cut from harness makers felt slightly larger than the metal plates, are applied to the limb at the proper distance above and below the site of fracture which is to be immobilized or the joint to be mobilized. Customarily these are applied on the lateral surfaces of the limb for fractures of the lower extremity, with the exception of the hip joint where, for anatomical reasons, one pair is applied laterally and the other pair is placed on the anterior surface.

The metal plates are next placed on the pads, care being taken at this time to see that they are

properly spaced and in line. Both pads and plates are now secured in position by strips of adhesive plaster encircling the limb.

The plaster bandage can now be applied in the usual manner, making one entire cast. While the bandage is being wound on over the bolts an assistant makes a longitudinal slit in the bandage by puncturing it with a sharp knife or scalpel. Through the slit in the bandage the plate bolts emerge and project from the surface of the completed cast.

The bridges can now be applied over the bolts and secured in position by screwing down the nuts while the plaster is still soft.

At the expiration of 24 hours, or whatever time is required for the cast to dry, the cast can be divided into its respective sections. At the site of fracture, a simple incision encircling the limb is all that is required. For mobilizing a joint a section of the cast needs to be removed. The width of this section should be sufficient to permit the normal range of motion at this joint.

A Roentgenoscopic examination will now show the extent of fragment displacement and its character and the splint section can be adjusted to assist in overcoming this displacement.

For fractures of the upper extremity, except in very muscular individuals, one bridge to connect the sections should suffice. Its position will vary according to the situation of the fracture or the posture in which the limb is to be placed, though as a rule, it is more convenient to apply it to the anterior or external surfaces of the arm or forearm.

When applied in compound fractures the bridges should be placed in such a position that their presence will not interfere with the removal of a fenestrum from the cast to facilitate change of dressings, removal of sutures, etc.

My object in presenting this modified type of plaster cast is the belief that its use furnishes a method of securing better end results and enables one to deal successfully with a greater percentage of fractures which under any other method of treatment would necessitate operative measures for fragment fixation. It is particularly applicable when for some reason or other we do not deem the administration of a general anesthetic advisable.

It has been demonstrated practically that this dressing, although capable of a wide range of change in form, possesses the same degree of rigidity and immobilizing properties as the one piece cast.

The only claim to originality is in the design of the bridge, its method of attachment and its application to all varieties of fractures without changing construction.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.
J. MacDONALD, Jr., M.D., President and Treasurer
92 William St., New York, U. S. A.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor
NEW YORK, NOVEMBER, 1918.

GYMNASTICS VERSUS MASSAGE.

Following tradition is, as a wont, characteristic of peoples in all stations of life. Even textbooks of medicines will carry on traditions of the past, accepting them without question when testing would prove them unworthy of further support. Theories after theories have been exploded as a result of the investigations of laboratory workers. Our therapeutic agencies have undergone marked alterations as a result of improved methods, new discoveries, and pharmaceutical developments.

Present day experiences with injuries of bones and joints have given rise to numerous variations in operative technic and after treatment. Surgeons are no longer satisfied with successful operative results. Restoration of function has taken on a new significance, in order to prevent crippling and deformities which might interfere with the future industrial welfare of soldiers who have spent their energies and tissues in the defence of national honor. Orthopedic surgery has made marked progress owing to the demand for complete re-education and restoration of function.

In the past, reliance has been placed upon massage as a method par excellence for releasing stiff joints and promoting complete mobility. The traditions have been followed and a masseur has been ordered with directions to give the patient massage for the relief of this, that, or the other condition.

There have been many weaknesses in this procedure, the main ones being due, on the one hand, to the comparative lack of knowledge of the surgeon concerning the principles and methods of massage, and, on the other hand, the lack of technical knowledge on the part of most of those attempting to secure the breaking up of the dense adhesions preventing joint movement.

War experiences have demonstrated that the first and most significant factor in securing joint function is the will of the patient, the determination to direct and secure muscular action with the exercise of much patience and tenacity of purpose. Because of this, a new value must be placed upon applied gymnastics as a means of securing active rather than passive exercise for the relief of disabled limbs and joints. Brevet Colonel H. E. Deane, in his recent book on *GYMNASTIC TREATMENT FOR JOINT AND MUSCLE DISABILITIES* (Oxford University Press), calls attention to the value of simple gymnastic exercises as an advantageous substitute to passive manipulation. He stresses the benefits to be derived by voluntary movements in stimulating and encouraging patients to use their muscles in the attempt to regain power. A fraction of movement secured in response to volition is infinitely more valuable than a greater amount of movement obtained by passive methods. A gymnasium is not an essential. Skipping ropes, dumb-bells, Indian clubs, a punching bag, a simple pulling machine, and the vertical rope represent simple appliances which may be utilized at home. To these may be added the wall bars, the nautical wheel, and some of the more simple forms of apparatus which should form part of the physical educational paraphernalia of every surgical institution.

Games constitute a particularly encouraging form of exercise which carries with it interest and enthusiasm as stimulating supporters of a desire to become whole. They call forth larger measures of voluntary effort than can be secured through formal gymnastics. Croquet, bowling, handball, baseball, and the various other types of mild playing are to be utilized not merely for the competitive stimulation and the arousing of a desire to win, but as a means of indulging in physical exercise which will release nerve tension, while at the same time calling upon the nervous and muscular centers to more nearly approach their normal functions.

Where possible, the gymnasium may be employed under surgical supervision to secure results much more rapidly than would be possible under the older system of massage. Obviously, direction and supervision are requisite, while hot baths, electrical

stimulation, massage, orthopedic machinery, etc., must be given their places as conditions indicate.

Most physical disabilities following war injuries are due to cicatrices or adhesions involving the skin, subcutaneous tissues, muscles, or joints. In overcoming disabilities from these causes, gymnastics, plays, games, and purposeful exercises merit careful study and application with a view to overcoming the apparent defects without any sacrifice of the inherent moral and vital qualities essential to rapid recovery. "The will to do" remains the point of departure for securing most rapidly the ultimate return to the functional capability. Early activity rather than passivity is of the utmost movement in securing the maximum mobile benefits. Massage has its place in the restoration of function of injured joints, but in all probability it is secondary to voluntary physical exercise, properly guided and directed by intelligent surgical judgment.—I. S. W.

THE PREPARATION FOR OPERATION.

One of the ruts, in which medical thinking has become mired, is the subject of preparation before an operation. Especially so in abdominal operations, where the question of adequately emptying the bowel, has hitherto seemed so necessary. And, yet, when one thinks of the many desperately sick patients, whom we have all submitted to emergency abdominal operations without any preparation—that is catharsis—at all, one remembers that they did equally well with those "adequately prepared"; one seems sure that there was much less postoperative abdominal pain and distention.

These clinical facts seem to have taken root and within the last year or two Alvarez and Taylor* have advanced the view that the omission of the customary, and routine, preparation had resulted in greatly improved results, and that much of the postoperative nausea, vomiting, gas-pain and intestinal paralysis was due to the purge. They have fortified their view by a number of experiments carried out in the physiological laboratory.

A number of animals were thoroughly purged. The intestinal loops of these animals were reddened and angry-looking, and their lumina were full of gas and fluid. There seemed to be no co-ordinated activity; part were atonic and flabby; other parts were irritable and were inclined to contract into hard white cords. Excised segments suspended in Locke's solution exhibited a weak motor activity and became fatigued easily. They responded less

readily to drugs; on one instance the usual dose of adrenalin had to be multiplied a hundredfold to produce any reaction. All of the animals, in addition to presenting these local findings, looked sick.

When the animals were not so severely purged, there seemed to be no general symptoms, but, even in these, the intestines showed abnormalities.

The experiments of Alvarez* have convinced him that the harmfulness of the cathartic drugs is directly due to the fact that they are irritant poisons which must be removed quickly from the body. Some of them interfere with the absorptive balance of the bowel. In either case they bring about disturbances: the body is generally weakened and not strengthened; the dehydration of the body and the upset in salt balance is also bad. There is some evidence that bacteria grow more easily, that toxins are developed more freely, that the mucous membrane becomes more permeable.

Of the drugs usually employed magnesium sulphate seems most objectionable because of its action in preventing absorption. Calomel and cascara have a less fatiguing action on the bowel than castor oil, magnesium sulphate and jalap. After the exhibition of calomel the intestinal coils act well.

The lesson seems evident: the less purging before operation, the more comfortable the convalescence. If, on the other hand, a purge seems desirable, sufficient time should be allowed to elapse for the bowel to return to a normal condition.—A. O. W.

SURGERY OF JOINT WAR-INJURIES.

In no other branch of surgery are the good effects of radical treatment so marked as in the treatment of joint injuries. The surgery of civil life had inculcated the habit and method of drainage and it was heresy to think of other methods. Very quickly the experiences of the war have disillusioned every one; fatalities were frequent, amputations were constantly being done, much valuable time was lost, and, on the whole, the results were bad.

Quickly, too, came the feeling that war wounds were, so to speak, "cancers"; lesions that were full of potentialities for mischief; lesions that ought to be treated by similar methods. And, so, it came about that the lesions were widely excised, either the missile track, or a block resection of the joint with all the destroyed and infected tissues. It was learned, also, that the synovial membrane had powers of protection against infection; and with a properly carried out excision, done sufficiently early, both the joint

* *Journal of the American Medical Association*, 1917.

* *Surgery, Gynecology and Obstetrics*, June, 1918.

and the outer wound could be sutured tightly, and with impunity; and a healing of the wound would immediately follow, without infection and with no secondary consequences. This is the method of choice to-day: a complete excision followed by an immediate suture.

There is much to learn from this lesson. The most important is that surgery is full of superstitions that have been handed down from year to year, superstitions which bind one and limit one's knowledge. It teaches nothing so well as that one's mind should, in the consideration of any one problem, begin anew by freeing itself from old ideas.—A. O. W.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

SAFETY FIRST?

The Safety First Movement has now been under way for several years. The measure of its achievements should be reflected in a diminished mortality rate from accidental causes. The great interest in the casualties of war has deflected interest in ordinary civilian movements so that their evaluation has been neglected.

It is proper to inquire what have been the tangible results of the campaigns for reducing the general accident rate. Full judgment must necessarily be suspended, because since the world war has been on, industrial activity in the United States has been rushed; while since the entrance of the United States into active participation, factories and mills, shipyards and munition plants have been working to their utmost capacity, at highest speed, 24 hours a day. If one considers, however, the mortality rates of 1916 as presented in the 17th Annual Report of the Bureau of the Census, one is forced to the conclusion that the sum total of results is not as satisfactory as might be desired, or as might have been expected.

The annual average mortality rate per 100,000 for the period 1901-1905 from external causes, including suicide, was 101.7, while in 1916 it was 105.1. The total mortality from accidental or undefined causes was, respectively, 84.9 and 83.9. This latter figure would indicate a comparatively small reduction in the mortality rate from accidents, but this is accentuated by a study of specific causes of death which might have been expected to evidence the benefits of greater carefulness in the prevention of accidents.

Deaths from burns, excepting those due to conflagrations, numbered 5,726 in 1916, with a mortality rate of 8.0 as opposed to 8.3 as the average for the 1901-1905 interval. Drowning gave a rate of 8.6 as opposed to 10.3; traumatism by fire arms 2.3 as against 3.4; traumatisms by falls were responsible for 10,775 deaths with a rate of 15 as opposed to 15.4 in 1913. Traumatisms in mines and quarries presented a total rate of 3.1 in contrast with 1.0 in the five years period taken for purposes of comparison. Traumatism by machines 2.3 in 1916, compared with 0.9. Railroad accidents and street car accidents together yielded a mortality rate of 13.8 in 1916, compared with 15.2. Injuries from automobile accidents and by other vehicles furnished a mortality rate of 10.6 in 1916, compared with 2.6, the annual average from 1901 to 1905. Obviously, here the increase is largely due to the greater number of automobiles in daily use for pleasure and transportation, inasmuch as they alone were responsible for 7.3 deaths per hundred thousand population. Deaths from electricity have decreased slightly, while fractures from causes not specified have fallen to 0.9 from a rate of 8.5.

While homicide need not be regarded always as accidental, it is striking to note that the mortality rate from fire arms, cutting or piercing instruments or other means have increased to 7.1 in 1916 from the low figure 2.9.

These figures are presented merely as the basis of inquiry. If the Safety First Movement had not been inaugurated and widespread campaigns of education had not been attempted, what might the mortality rate from these causes have been? To put the question in another form, how much influence has the Safety First Movement had in reducing the mortality rate from accidents? It is patent that mortality figures do not present any direct relation to the number of accidents that may have occurred. A few serious railroad accidents, a sudden explosion, may be responsible for large numbers of deaths with comparatively few injuries, while on the other hand a large number of minor accidents may occur without any increase in the mortality rate.

Regardless of the number of factors which may enter into mortality rates from accidental causes, it is apparent that greater attention must be paid to the educational campaign for the restriction and decrease of accidents of all character. The tendency toward increase must needs be counteracted by due and proper law enactments after investigation, together with more adequate provision for the en-

formulation of such laws and regulations as will tend to safeguard the welfare of the people.

It is unnecessary to stress the importance of more sane provision for public welfare in the case of automobile accidents, but it is wise to call attention to the fact that in 1916 27.9% of the total number of deaths from automobile accidents were of children under fifteen years of age. The greatest number of deaths from accidental causes during 1916 were due to traumatism by falling, following which came deaths due to railroad accidents and injuries, accidental drownings, burns, automobile accidents, and homicide. Whatever gains may have been made for the general public through attention paid to accidents and organized attempts to forestall them, the statistical record indicates that there is much to be accomplished.

As a partial defense of the Safety First Movement, it may be said that in 1916 the movement had barely begun as a national effort, and, in consequence, the statistics of 1916 do not adequately express the results which may have been secured through the educational propaganda. There is a wealth of suggestion in these statistics of accidental deaths, which merit careful study by those interested in accident prevention. It is to be hoped that the mortality figures for 1917 will show a marked improvement and indicate that our faith in educational campaigns for the prevention of accidents is not misplaced.

Dr. Geo. Chaffee, of Brooklyn, New York City, has located in the city of Binghamton, N. Y., and has opened an office at 100 Hawley street in that city. He will limit his practice to Modern Operative Bone Surgery and to consultations.

Dr. Chaffee has been on the surgical staff of the Polyclinic Hospital in New York City for the past twenty-five years, where he has had the benefit of seeing and treating a large number and great variety of surgical cases.

He is founder and for five years was chief of the staff of Bay Ridge Hospital in Brooklyn. Is founder and ex-president of the New York and New England Association of Railway Surgeons.

For twenty-eight years Dr. Chaffee has given special attention to accidental surgery. During this time he has enjoyed a national reputation in this line of surgery, and has stood at the head of railway surgery in the East.

Book Reviews

A Treatise on Cystoscopy and Urethroscopy. By DR. GEORGE L. LEVY, DERMATOLOGIST, HOSPITALS OF PARIS; former assistant in the department of urinary diseases at the Labriboisiere Hospital; Laureate of the Faculty of the Academy of Medicine. Translated and edited with additions by ARTHUR L. WOLFE, M.D., New York, Cystoscopist, Beth Israel Hospital; consulting urologist, Central Islip and Manhattan State Hospitals; genito-urinary surgeon, West Side German Dispensary and Hospital; author of "Gonorrhoea in the Male," etc. Large octavo volume of 386 pages with 217 figures in the text and 24 chromotypographic plates outside the text, including 76 drawings from original water colors. St. Louis, C. V. Mosby Company, 1918.

Progress in genito-urinary surgery in the latter years has been directed in the path of elaborating methods of exact diagnosis in diseases of the genito-urinary tract. Much of the success attending these endeavors has resulted directly from the excellence of the instruments of precision invented in the last twenty years which have permitted almost direct access to the diseased parts. As a result genito-urinary diagnosis has become, as near as such may be, an exact science.

It is a pleasure to review this excellent book. The subject matter is well written and easily readable; thorough in all regards and illuminated when needed with well chosen cases; splendidly, profusely and adequately illustrated. If there be any criticism to make, it would be that more attention could with advantage, have been directed towards endovesical operative surgery. One notes with much satisfaction that men who write reference books are learning to incorporate all the necessary references to enable the reader, when he so desires, to look up the subject at the original sources.

No genito-urinary surgeon can well do without this book.

The Hodgen Wire Cradle Extension Splint. By FRANK G. NIFONG, M.D., F.A.C.S. With an introduction by HARVEY G. MUDD, F.A.C.S. Octavo; 162 pages with 124 illustrations. St. Louis; C. V. Mosby Company, 1918.

The greater part of this monograph is practically a dissertation upon fracture of the femur during the course of which the various forms of appliances, used for immobilizing purposes are described and compared. The greatest attention is given to the Hodgen splint, inasmuch as, in the writer's opinion, this surpasses all others in usefulness both in military and civil practice. The experiences of the war substantiate this opinion. A chapter is devoted to the use of this splint for the upper extremity.

Military Surgery of the Zone of the Advance. By GEORGE DE TARNOWSKY, M.D., F.A.C.S., Surgeon to Cook County and Ravenswood Hospitals, Chicago; Major, M.C., U.S.A., American Expeditionary Force, France, 1917-1918. Duodecimo of 330 pages with 36 illustrations. Philadelphia and New York: LEA & FEBIGER, 1918. Leather, \$1.50.

Medical War Manual No. 7 was authorized by the Secretary of War and was prepared under the supervision of the Surgeon-General and the Council of National Defense. It covers all of the medical and surgical problems encountered by the medical officer from the firing line to the point in the rear variously called evacuation hospital or casualty clearing station. Most of the observations are based upon a thorough study made while the author was visiting the various fronts.

Beginning with a description of the terrain, the writer describes the facilities available, the kind of wounds en-

countered, the character of the infectious process, the conditions of the soldier at the time the wound is received, and the methods of treating shock. A large part is devoted to individual lesions in the various body segments.

The volume is tersely written and is a "résumé of the primary treatment . . . which has proved most satisfactory in the opinion of those best qualified to judge."

La Suspension dans le Traitement des Fractures. Appareils Anglo-Américains (Suspension treatment of fractures.) By P. DESFOSSÉS, Chirurgien de L'Hôpital britannique de Paris, and CHARLES ROBERT, Ancien Interne des Hôpitaux de Paris. With a préface by M. PIERRE DUVAL. Small octavo of 172 pages and 109 illustrations. Paris: MASSON ET CIE., 1918.

Methods of treatment in war differ essentially from those of civil life in that the numbers of wounded to be dressed outnumber largely those encountered in ordinary life; and methods of treatment must be invented which will permit of a maximum number of dressings being done within a minimum time and with a minimum amount of discomfort to the wounded. This is especially so in fracture treatment and the problem has apparently been solved by the principle of suspension. The method has become universal and a large number of various forms of apparatus and splints have been invented, of which a certain number have become, so to speak, standards. All of these are painstakingly described with full directions for their construction and use. The volume is exceedingly useful for military medical officers and undoubtedly will subserve a similar function to those entrusted with the care of civil injuries.

International Clinics. A quarterly of illustrated clinical lectures and especially prepared original articles, etc. Edited by H. R. M. LANDIS, M.D. Octavo of 286 pages and many illustrations. *Volume II.* Twenty-eighth series, 1918. Philadelphia and London, J. B. LIPPINCOTT COMPANY, 1918.

This volume contains a large number of clinics and original articles, among the more important of which can be mentioned the clinic of Archibald on pancreatitis; that of Larkin and Levy on blood determinations in kidney disease; the clinic of Lewis; that of Lind on syphilis of the nervous system; and of Ayraud on primary tuberculosis of the conjunctiva. Stone contributes a short historical sketch of obstetrics and gynecology.

All of these are written with their usual excellence and are well and profusely illustrated and should be of much interest to everyone.

Books Received

Gynecology. WILLIAM P. GRAVES, A.B., M.D., F.A.C.S., Professor of Gynecology at Harvard Medical School; Surgeon-in-Chief to the Free Hospital for Women, Brookline; Consulting Physician to the Boston Lying-In Hospital. With 368 half-tone and pen drawings by the author and 123 microscopic drawings by MARGARET CONCREE and RUTH HUESTIS. With 100 illustrations in colors. *Second Edition*, thoroughly revised. Philadelphia and London: W. B. SAUNDERS COMPANY, 1918. Price, \$7.75 net.

Surgical and War Nursing. A. H. BARKLEY, M.D. (Hon.), M.C., F.A.C.S. Lecturer at Good Samaritan Hospital Training School for Nurses; Consulting Surgeon, Good Samaritan Hospital, Lexington, Ky. With 79 illustrations. C. V. MOSBY COMPANY, St. Louis, 1918. Price \$1.75.

Progress in Surgery

A Résumé of Recent Literature.

Gun Shot Wounds of the Knee Joint with a New Method of Draining the Knee Joint. K. SPEED, *Journal American Medical Association*, March 30, 1918.

Speed reports observations on eight-five consecutive cases of wounds of the knee joint treated in a British hospital in France. He gives an outline of the chief points in the study of these cases, and describes the general procedure. He reports the findings in 845 knee joint operations reported by Barling in the Rouen district, with a tabulated statement of the operation performed and the mortality percentage. In Speed's eighty-five cases the synovial lining of the joint was opened by the missile in every instance. There were two deaths, only one of which was due to the knee injury itself. The synovial surface alone was involved in forty-two instances in three of which amputations were made. In the forty-three remaining, there were bone injuries with six amputations. In twenty-five patients, foreign bodies were present in the joint, in eighteen patients they were present in the bone. The amputations numbered nine. Six of these had complicating bone injury. The foreign body was removed in seven. In addition to these nine there were three patients who may possibly have gone on to amputation later in England. Looking at the figures from another standpoint they found that sixty-six of the eighty-five patients suffered penetrating wounds with no wounds of exit, and completely perforating wounds were found in nineteen. The results of treatment of sixty-six patients are given in a table. In the perforating wounds, there was one death, not due to the knee joint injury, one amputation, two in which the results were fair, ten in which the results were good and five in which the results were excellent. Early treatment was received by sixty-five, with wound excision and joint closure. Thirty-eight had bone complications, six suffered amputations, and two died. As regards surgery, forty-fourteen cases healed cleanly, demanding no surgical interference; four demanded secondary aspiration, and thirteen demanded secondary operation including the amputations mentioned. In the light of results of recent experience, Speed says after a knee joint injury the soldier should be splinted at the first dressing post and not be allowed to walk on the leg. All operations should be done at the casualty clearing stations, within twenty-four hours after the wound is received, if possible, or better yet, within eight hours. Under severe battle conditions certain types of knee injury may be evacuated at once. Wounds of the posterior aspect of the knee are more favorable for transportation, since they are less likely to drain into the wound. More severe cases should be retained at the casualty clearing stations for early operation, either radical or conservative. Radical treatment calls for either amputation or resection, the former if there is severe blood vessel injury or if severely comminuted fractures into the joint exist. Resection is advised if a comminuted fracture leaves little normal joint surface, as such injuries will later demand amputation if not resected. Conservative treatment is reserved for the through and through penetrating wounds, even in the presence of fractures not calling for resection or amputation. If the patella is shattered, it is removed, its periosteum spared and the synovial membrane closed, if possible. If the presence of a foreign body is suspected, a roentgen-ray examination should be made before operation is attempted. The author describes the steps of the various operations demanded by joint injuries. In case of septic joint, he does not believe in drainage of the knee or joint excision. Early amputation gives a lower mortality, and better satisfaction. In the middle of 1917, he began to drain septic knees very early through the upper part of the subcrural pouch. Remarkable relief followed the small incision and drainage, but the later results were not always good. It was finally decided to drain soon after the cultural diagnosis, and then with the leg firmly held in a Thomas splint.

The patient must be turned over on his face in order to allow the drainage of the small opening which is made in the skin at the most dependent point of the joint. This subcutaneous pouch drainage and inversion treatment is described at length, and the rules for the treatment of war wounds, adopted by the Interallied Surgical Conference, are given. Speed ends his paper with a report of a case in which the inversion treatment was used.

Lumbar Puncture Headache. R. G. McROBERT, M.B. *The New York Journal of the American Medical Association*, May 11, 1918.

McRobert says that lumbar puncture headache differs from all other headaches in that, being present when the patient is sitting up, it completely disappears when he lies down. It is throbbing and severe, and is felt mostly in the frontal and occipital regions, and no drugs give sufficient relief to allow the patient to walk about. Regarding causative or influencing factors of the headache, various speculations have been made concerning the importance of such points as the rapidity of withdrawal of spinal fluid, its degree of pressure at the time of puncture, the position of the patient during the puncture, his age and his diseased condition. Some observers believe that lying flat on the back for twenty-four hours following puncture, the presence or absence of syphilis, and the amount of fluid withdrawn, are important. The twenty-four hours' supine position has been the practice in the Neurological Institute. This should give time for the replacement of the small amount of fluid withdrawn. Out of a series of thirty cases in which this point was strictly adhered to, twelve developed the typical severe headache. His observations do not lead him to put much stress on the presence or absence of syphilis, but the question of the amount of fluid withdrawn is interesting. The equal liability of headache after the withdrawal of 2 c.c. and 20 c.c. has often been demonstrated. While the consensus of opinion is that the amount of fluid withdrawn has an influence, it seems ridiculous, since the amount of cerebrospinal fluid secreted during the day is probably 60 c.c. or more, that the withdrawal of 2 to 5 c.c. could be able to alter the intracranial situation sufficient to cause violent headache of seven or more days' duration. Consideration of these facts lead him to look further for the cause. The author says one can soon convince oneself, by trying it on the cadaver, that a puncture of the intradural membrane usually persists as a clean edged, round hole, and he asks, "Why may there not be a continuous leakage?" The spinal fluid is always under some pressure, and the closure of the puncture hole usually takes place, he thinks, in the following way: The arachnoid tissue, as it drops from the point of the departing needle, is pressed against the dura mater, blocking it, or if this is not the case, it passes through the dural hole forming a sort of spout or wick for the easy drainage of the total cerebrospinal fluid sac. The brain, normally, rests practically on a water cushion which is made less perfect by the withdrawal of fluid, and if the leakage is continuous we may expect the pressure of the brain weight on the clivus of the occipital bone must be greatly increased when the patient sits up. This headache can be understood as due to the sudden "heightened intracranial pressure due to the rise of pressure in the cerebral veins; its entire relief, when patient lies down, as due to the fall of pressure when the weight is removed from the veins on the clivus." In the course of a week the puncture hole fills, the spinal fluid rapidly secretes and the integrity of the brain cushion or water-bed under the brain is restored. That the headache is of purely mechanical origin, is McRobert's opinion, and is explained by him as above.

Fracture of the Elbow. JACOB GROSSMAN, M.D., *Interstate Medical Journal*, June, 1918.

Acute flexion is the best position for all fractures of the elbow except fractures of the olecranon process. These latter should be retained at almost complete extension.

Passive motion, massage and exercises should be given early. The tenth to the twelfth days are usually very good times to begin. Continue this treatment until the movements of the elbow are normal and free from pain.

Displacement of the fragments must be guarded against

when passive movements are begun, as faulty reduction causes periosteal proliferation that may lock the joint.

Fracture of the head and neck of the radius while not a common condition, occurs often enough to be considered while making diagnosis of injuries to the elbow.

A Two-Stage Operation for Tendon Suture in the Hand, and Description of a Simple Stick. J. E. FULD, New York, *New York Medical Journal*, May 4, 1918.

Fuld has found that frequently after a supposedly successful tendon suture, that function is not completely restored. This is not due to separation of the ends, as he formerly believed, but to adhesions between the tendon and the sheath. Fuld advises in such cases, therefore, a secondary operation some weeks later, when the adhesions are completely loosened. When the wound has healed, it is important to inaugurate gentle passive motion with long excursions. For primary suture of the tendon, Fuld has devised a stitch, the principle being that the knot comes to be between the ends of the divided tendon, thus affording no range surface to stimulate adhesions.

The needle enters the tendon on its lateral surface one half inch above the cut end, passes transversely through one half the thickness of the tendon, to emerge on the opposite side. The needle then enters the tendon on its anterior surface at a point one quarter of an inch from its cut end, three fourths of the distance across the tendon. Perforating to one half its antero-posterior thickness, it passes longitudinally through the length of the tendon, emerging at its cut end to one side of the median line. The free end of the silk is crossed diagonally over the other suture, perforates the tendon one quarter inch from the cut end, passes through the length of the tendon, and emerges on the other side of the median line. Sutures are now passed in similar fashion into the other end of the cut tendon and then tied to corresponding sutures opposite; burying the suture knots between the approximated tendon ends. Where the two severed tendon ends cannot be brought together because of muscular contraction, or because they are deeply buried in dense fibrous tissue, I have obtained good functional results by removing the injured segment, and inserting a graft of tendon with its sheath.

Passive movements are begun at the end of three weeks, and voluntary motion at the end of six weeks.

Tendon Transplantation. M. S. HENDERSON, *Journal American Medical Association*, May 18, 1918.

Henderson recommends the use of tendon transplantation to make up for old gaps in other tendons. He has used it in two cases where the hand was involved in one, and in the other, the knee. In the latter the result was all that could be desired. In both, the peroneus longus was utilized. The hand case is too recent to report conclusions though the wound healed by first intention. The peroneal tendon has an advantage for transplantation over the fascia lata, as it is a true tendon ready to take on full function as soon as nourished in its new situation. The removal of the tendon causes no inconvenience to the patient, and it is possible that full regeneration takes place. He describes his method of obtaining the tendon, which may be divided longitudinally into two or three pieces if needed.

Operative Treatment of Fracture of the Spine Complicated by Cord Injury. E. G. BRACKETT, W. J. MIXTER, and J. C. WILSON, *Annals of Surgery*, May, 1918.

Operative treatment is indicated for the following conditions:

Fresh fractures: (1) crushed fracture of the bodies of one or more vertebrae associated with disalignment of fragments particularly with involvement of the laminae; (2) fracture of the fifth lumbar particularly with involvement of the laminae; (3) fracture of the body showing an increased knuckle, abnormal mobility at point of fracture, or complicated with rupture of the supraspinous or interspinous ligaments.

Old fractures which show persistent disability, as evidenced by inability to work, accompanied by continuance of pain, local or referred and with general back weakness should be operated upon.

Arthrodesis of the Shoulder Joint. C. HERMANN

BUCHOLZ, M.D., Boston, *American Journal of Orthopedic Surgery*, July, 1918.

Arthrodesis of the shoulder is indicated in cases of complete flaccid paralysis of the deltoid and supraspinatus muscles, provided the other scapular muscles, especially the trapezius, pectorales, serratus anterior and the rhomboids are strong enough to raise the scapula and arm.

The operation may be done when the bones are sufficiently large and strong, and when after-treatment can be carried out for a sufficiently long time. Our own cases were young adults.

A question of great importance is that of a thorough and persistent and intelligent after-treatment.

From the study of the end-results reported, it cannot be doubtful that the function of the arm has been most frequently improved by arthrodesis. One can say that, proper indication and correct technic supposed, bony ankylosis will almost certainly take place, giving the arm the much-needed stability and furnishing a very useful amount of motion.

The Recurrence of Symptoms Following Operations

on the Biliary Tract. E. E. JORD, M.D., *Annals of Surgery*, April, 1918.

Removal of the gall-bladder reduces the risk of later troubles, and ordinarily is to be preferred to cholecystostomy for drainage.

It is not necessary to open and probe the common duct at every gall-bladder operation.

Infection in the liver, gall-bladder, or ducts is the most frequent cause of secondary trouble, and may recur many years after the primary operation.

The recurrence of stones is more frequent in the gall-bladder than in any other part of the biliary tract. The common duct is next in point of frequency.

In a definite small percentage of cases stones will be overlooked in the common duct; in other cases the stones recur in the duct.

Formaldehyde-Phenol in Camphor Paraffin. A New

Wound Antiseptic. KARI GUNDEL, M.D., *Surgery, Gynecology and Obstetrics*, July, 1918.

The combination described was the result of a laboratory survey by new methods of the various clinically useful antiseptics.

Method of application: Free surgical drainage should be established. Gauze saturated with the antiseptic should be applied as packing into all clefts and pockets. The interior of the wound should be packed firmly, but the drainage openings should be packed loosely. On open wounds it is spread and covered with paraffin gauze.

In the present combination the toxic properties are within reasonable limits. For subsequent dressings chlorine antiseptics are more advantageous.

It combines the powerful penetrating effects of formaldehyde with the anesthetic effect of phenol aided by the camphor. Both of the latter together display a clean odor and fly-repellent qualities. The paraffin prevents blocking of the discharge and allows easy removal of the packings.

The Relation of Gastric Ulcer to Cancer. JAMES EWING,

Annals of Surgery, June, 1918.

The writer is forced to conclude that the cancerous transformation of peptic ulcer is rather infrequent and probably does not exceed 5 per cent. This proportion would be much smaller if only those cases were included in which the evidence is demonstrative, viz.: a long history of gastric ulcer, the limitation of the tumor to isolated foci or one portion only of the ulcer, and freedom of the base from infiltration.

Syphilitic Reinfection. J. SPANGENTHAL, *Journal American Medical Association*, August 31, 1918.

Joseph Spangenthal reports a case of syphilitic reinfection. The first appearance of the primary lesion occurred in September, 1913. The patient was a married man and had infected his wife. Both patients were treated by neosalvarsan and other specific treatment and recovered from this attack. At intervals of six months the patients reported for a Wassermann test which was always nega-

tive. In March, 1918, he developed another primary sore followed by secondary symptoms and two Wassermann tests were + + +. This case seems to support the theory of the curability of syphilis, if it is admitted that it cannot recur in a cured case without having undergone complete recovery.

Immediate Jejunal Feeding After Gastro-Enterostomy.

ALBERT F. R. ANDRESEN, *Annals of Surgery*, May, 1918.

It is proposed to introduce a Rehbus tube, which had been previously swallowed, at the time of the operation directly through the anastomosis into the jejunum. Feeding of peptonized milk, etc., can be commenced immediately with great value to the patient.

Developmental Reconstruction of the Colon. JOHN

WILLIAM DRAPER, M.D., *Annals of Surgery*, May, 1918.

Developmental reconstruction of the colon is an operation which finds justification in heredity, in well known laws of biology, and in clinical study.

It is a procedure fraught with danger and one which never should be undertaken until, not alone exhaustive studies have been made, but until modern and well-directed medical therapeutics has failed.

Ileosigmoidostomy is unphysiologic and has therefore failed.

The subjective symptoms for which the operation is indicated are usually neuromental; the objective symptom is caecocolonic degeneration. The degree of improvement in our series is amply sufficient to justify the operation in selected cases.

Developmental reconstruction has superseded in our clinic all the earlier forms of operative procedure such as ileocolostomy, caecosigmoidostomy, etc., because we have found it to be no more dangerous operatively and to give better results because it removes the biologically decadent and diseased organ and restores the individual to the carnivorous type of colon undoubtedly best suited to man.

Cancer of the Rectum. JEROME M. LYNCH, M.D., *Annals of Surgery*, April, 1918.

Lynch urges that digital and proctoscopic examinations be made a routine for all patients presenting gastric or intestinal symptoms. If this is adapted a great many cases will be diagnosed early and saved.

That all cancer cases should be referred to a surgeon, as he is best fitted to pass judgment as to whether they are suitable for operation or not.

If inoperable, colostomy should be performed as soon as possible, thereby saving much suffering and discomfort.

That no patient should be denied a radical operation until it is proved beyond doubt that it is not justifiable.

That our technic is now more perfect and consequently we are saving many cases which previously died from shock and peritonitis.

Pneumococcal Peritonitis. E. W. MEREDITH, Pittsburgh,

Pennsylvania Medical Journal, June, 1916.

The method of invasion is not known. The greater frequency in females would indicate that the genital tract is responsible for a large number. It usually occurs in girls below ten years of age. There are two types: diffuse and circumscribed; the latter is simply a later stage of the diffuse form. The patient is suddenly taken ill with abdominal pains, fever, vomiting and tachycardia. Diarrhea is common. The leucocyte count is usually high. There is rigidity, some tenderness but with no maximum point; no distension. After several days, distension with signs of a peritoneal exudate appear and the condition of the patient improves. A localized abscess forms, which, if not opened, tends to burst through the umbilicus. The differential diagnosis is difficult. On opening the abdomen, the pus is characterized by lack of order, the presence of fibrin clots and its tendency to become pocketed by plastic adhesions. The mortality is high in the diffuse or fulminating types. If the diagnosis is firmly established it is wise to wait until the stormy symptoms subside and wait for localization to occur.

Pylorospasm and Congenital Pyloric Stenosis. Prob-

Armstrong, George. Boston Medical and Surgical Journal, May, 1918.

It is interesting to note that as early as 1777 George Armstrong, a keen, brilliant English pediatricist, described clearly the course of a child's illness who died of "spasm of the pylorus." The child was three weeks old. The usual diagnosis for the picture which goes with pyloric obstruction was termed "watery gripes" in Armstrong's day.

The child he refers to was autopsied by him and showed a dilated and filled stomach with collapsed intestine. He inferred that the pylorus was spastic and be very wisely stated that "perhaps cases of this kind are more frequent than is commonly imagined."

Congenital Variations in the Peritoneal Relations of the Ascending Colon, Cecum, Appendix and Terminal Ileum

June, 1918.

Variations in the peritoneal attachments of the colon, appendix, and terminal ileum have been recognized for a long time by anatomists and pathologists. Such variations are found frequently in infants, as shown by the examination of 105 between birth and 2 years of age. These variations are identical with certain adhesions seen in adults, usually termed Jackson's membrane or Lane's band and frequently but wrongly ascribed to inflammation. The clinical importance of these in relation to the syndrome of "chronic appendicitis" has, in the past 10 years, been demonstrated.

Tendon Operations About the Ankle for Deformity After Infantile Paralysis.

S. KLEINBERG, M.D., Journal of Orthopedic Surgery, July, 1918.

Tendon transplantations about the ankle are valuable procedures in selected cases for deformities after infantile paralysis.

Careful and prolonged supervision and cooperation of the parents are important factors to insure success.

Transplanted tendons should always be attached to bone, and not to soft parts.

The transplantation should be done through a sufficiently long incision to give the muscle a direct pull.

Tendon implantation (Gallie operation), when properly performed, is a valuable procedure.

After transplantation of the extensor proprius hallucis, deformity of the great toe occasionally results. The distal end of this tendon, therefore, should be attached to the common extensor tendons.

The peroneus tertius, though a small muscle, is in a favorable position to make it an important abductor of the foot.

Astragalo-scapoid arthrodesis deserves further trial in paralytic deformities of the foot.

Recovery of power in seemingly paralyzed muscles often contributes to a good result.

Empyema Drainage.

I. E. Roth, New York, American Medical Association, May 18, 1918.

Roth describes a new bed device, with illustrations, for facilitating the drainage of empyema thoracis, consisting essentially of two parts: "(1) an elevated canvas bed, spanned across the bed frame, with an opening in the canvas to permit the passage of a tube from the pleural cavity through into the pus bottle below, and (2) a series of air-tight bottles and tubes below the canvas bed. Bottle A is an 8-ounce, air-tight pus bottle communicating with the tube in the pleural cavity. From Bottle A, air is exhausted by means of Bottle B, which is a 2-gallon irrigating bottle in which a vacuum is created by letting water flow out of its spout at the bottom by gravity into Bottle C, which is a 2-gallon plain bottle. When Bottle B is empty, it can again be filled from Bottle C. The patient is placed over the elevated canvas bed with the affected side dependent, with the tube from the chest through the opening in the canvas bed. This position favors a constant gravity drainage." The arrangement of tubes and bottles below the bed, creating a vacuum in the pus bottle,

tends to exhaust the thick and tenacious pus from the pleural cavity. He cautions against the use of siphonage to create a vacuum in the pus bottle, because a cough or deep breath, which here acts as an automatic stop, would in the case of siphonage use make necessary a rearrangement of the apparatus. The essentials of the use of the method are enumerated as well as the advantages observed from its hospital use. It has been used in the Mount Sinai Hospital since August, 1917, and has given gratifying results. Case reports and other details will be published later.

Artificial Pneumothorax.

A. E. GREER, Journal American Medical Association, May 25, 1918.

Greer gives a record of thirty-two cases of pulmonary tuberculosis, in private and dispensary practice, treated by an artificial pneumothorax of nitrogen gas. He hopes it will disprove the necessity of sanatorium treatment and cause the profession to realize that a great deal can be done for the many patients at home, unable or unwilling to seek the western sanatoriums for relief. Nineteen men and thirteen women were treated. A Floyd-Robinson apparatus was used, and the operation was performed under procain and epinephrin anesthesia. The physical examination was, in most cases, supplemented by careful roentgen-ray examination. An effort was made to use only unilaterally involved cases, but this was not always possible. Twelve of the patients had involvement of the untreated lung, which was of a more or less inactive type. An area without cavities and rales in the untreated side, even if rather extensive in a lobe will give a better prognosis than a small active surface in that lobe. It is unwise, he says, to treat any case, except palliatively, which presents a tuberculous focus in the untreated basal lobe. Pleural adhesions should be at least limited or still better, absent. The technic is comparatively simple, and the operation safe if the indications are rigidly followed, and with a well marked Litten's sign and fair basal excursion, and absence of marked chest retraction, one may assume that troublesome adhesions are absent. Six cases are reported, and he says that a method that will bring about arrest in 44 per cent. of his thirty-two cases should have a well established place in the therapeutics of the disease. First-stage cases unilaterally involved should have this method tried and he thinks that the time is not far distant when this will be more generally done.

The Prevention of Permanent Bronchial Fistula Following Lung Resection.

HOWARD LILIENTHAL, Annals of Surgery, May, 1918.

After lobe resection for chronic inflammation a temporary bronchial fistula may be expected. The fistula will probably close spontaneously. It appears that as a general principle we may assume that, other things being equal, a bronchial fistula is apt to close in direct proportion to its distance from the body surface.

Constitutional Disturbance of Toxic Goitre as Influenced by Surgical Therapy.

C. H. FRAZIER, Philadelphia, Pennsylvania Medical Journal, May, 1918.

Frazier divides cases of toxic goitre into four types: (1) adolescent type, i. e., in young girls from 16 to 19 years of age—these are among the gravest forms with which one has to deal; (2) patients between 30 and 40 years of age, who for years have had a small adenoma, and then under the stress of psychic trauma develop symptoms of toxic goitre; (3) those that from the beginning are of the toxic type; (4) any of the toxic varieties of long duration. The patient presents symptoms of dysrhythmism. In this group, surgical operation is of no avail.

Frazier is convinced that with the calorimetric method of Du Bois, the gradation of the toxicity can be accurately determined.

In mild cases, lobectomy is the method of choice. In the graver forms the question whether lobectomy or ligation of the thyroid vessels should be performed is a delicate problem. In the earlier stages and if the patient is not too sick, the operation of choice is lobectomy; in the

later and more serious cases, ligation of the vessels is done as an initial step; at a subsequent period, not later than two months, lictomy is performed.

Frazier finds that the greatest benefit of surgical treatment is in regard to the nervous phenomena; next in the order of sequence upon nutrition, and last of all upon the circulatory disturbances. Many patients, otherwise feeling perfectly well, have tachycardia for a long time.

As for the amount of thyroid tissue to be removed, Frazier says that the nearer the patient is to menopause the greater the proportion of granular tissue to be removed. Frazier's tendency has been to remove greater and greater portions of the gland, so that, at the present, only about one-sixth of the gland is conserved. Frazier estimates his cures at about 70%. A cure in his interpretation means that the patient feels entirely well, even though some of the toxic phenomena are still present in a mild degree. He insists upon the necessity of careful after treatment to prevent recurrence.

The Surgery of Laryngeal Malignancy. H. ARROWSMITH, Brooklyn, *New York Medical Journal*, June 15, 1918.

Arrowsmith shows by statistics from individual operators that the operative mortality and percentage of recurrences have been steadily improving. There need no longer be any controversy over the respective merits of thyrotomy and laryngectomy. Each has its own precise indications. In the borderland the laryngologist must choose according to his experience. Arrowsmith makes a strong plea for the necessity of early diagnosis, for in such cases thyrotomy alone suffices. Arrowsmith suggests a preliminary tracheotomy before doing a laryngectomy in order to accustom the lower air passages to the direct contact with air. This is the ideal filler also for the oil ether colonic anesthesia devised by Gwathmey.

Retropharyngeal Abscess. C. C. RUSH, *Journal American Medical Association*, July 20, 1918.

C. C. Rush says that retropharyngeal abscess is imperfectly understood by physicians and a failure of diagnosis may be most unfortunate. He reports a case of the necropsy of a negro baby in which death occurred undoubtedly from strangulation by an abscess of this sort unrecognized by the physician or whoever treated it. There was no history of the case. The body, being unclaimed, became the property of the state anatomical board. He describes the anatomic conditions which favor the formation of such an abscess that has its freest extension in the loose retropharyngeal fascial space. The sources of infection are usually classed under four headings: 1. Caries of the upper cervical vertebrae, usually tuberculous. This may burrow laterally into various places, but occasionally the pus may burrow forward in the midline of the pharynx. 2. Those due to otitis media. The pus probably follows the eustachian tube along the tensor tympani muscle to terminate behind the prevertebral fascia. 3. Those due to an extension inward of a carotid abscess. 4. Those due to infection of the lymph nodes of the retropharyngeal space. As this space is composed of loose connective tissue behind the esophagus the unopened abscess can follow a course of slight resistance downward into the thorax. Such abscesses should be opened in the midline while the head is held low to allow the contents to flow out of the mouth.

Plaies des Gros Vaisseaux du Cou (wounds of the large vessels of the neck). PIERRE MOUQUOT, *Revue de Chirurgie*, November-December, 1917.

Wounds of the large vessels of the neck are occasionally seen which do not cause any immediately alarming symptoms. Arterio-venous aneurysm is a frequent complication, very frequently produced immediately after the wound, sometimes a few days later, and more rarely after several weeks.

Immediate attention to these wounds is accompanied by the danger of having to ligate the carotid and of stopping the circulation to the head and brain; and when there are no urgent symptoms the operation should be postponed. There is less danger in the ligation when it is done for aneurysm.

If immediate operation is necessary every effort ought to be made to avoid ligation of the common or internal carotid vessels.

The Part the X-ray Plays in the Treatment of Cancer.

ROBERT B. ARMSTRONG, *Journal-Lancet*, April, 1918.

The x-ray can never wholly supplant surgery but supplements it to a valuable degree. Proper technic and dosage are necessary. Cases beyond surgical aid often may be relieved; offensive sloughing may be checked; and the patient may be made more comfortable. A careful check must be kept upon the patient's general condition to guard against toxemia and acidosis.

Radium Treatment of Scars. W. C. STEVENS, *Lancet*, March, 1918.

1. Radium has a distinct sphere of usefulness in the treatment of scar tissue and fibrous adhesions.

2. It is a valuable adjunct to other methods of orthopaedic treatment, especially by shortening their duration.

3. Its effect is rapid, sometimes immediate.

4. It softens and mobilizes scar tissue.

5. It appears to facilitate subsequent removal of the scar by the knife.

6. It enables structures, like tendons adherent to the scar, to free themselves.

7. By loosening tendons and stiff joints it improves the functional power of the part.

8. It possesses the advantage of acting, to some extent, as an innocuous local anaesthetic for about a week.

9. It is particularly useful in treating scars and adhesions in the hands and fingers.

10. It is easily applied to the surface of the skin, and by this method causes no inconvenience to the patient.

11. To obtain the best results a single large dose is necessary.

12. The dose should not be so great as to produce inflammation of the skin.

13. With suitable dosage it appears to produce no ill effects.

14. In small doses it appears to hasten the healing of wounds, and to allay the painful inhibitory effects of the products of inflammation.

Radium Treatment of Lymphosarcoma of Neck and Face. JOSEPH B. BISSEL, *International Journal of Surgery*, April, 1918.

Lymphosarcomata, because of their wide dissemination, rapid growth and impossibility of complete removal by the knife locally, are not favorable cases for operation.

Radium acts at times on such growths with extraordinary quickness and certainty.

The action of radium depends upon the age of the growth, its extent, the size of the involvement and its location, as well as upon the technic of the application itself.

Operation is indicated only when the growth can be completely removed together with wide amounts of the surrounding tissue, and it should always be followed by radium treatment.

The Management of Renal Tuberculosis. H. G. BUGBEE, *Surgery, Gynecology and Obstetrics*, May, 1918.

The present status of renal tuberculosis may be summarized as follows:

1. Renal tuberculosis may be primary lesion and arises from a filtration of tubercle bacilli from the blood stream into the parenchyma or tubules of the kidney, where tissue changes similar to those found in other tuberculous foci take place.

2. An effort is always made to wall off the process but the formation of antibodies is so slow, and the immunity of the patient, which may have always been absent or which may have been temporarily diminished is so low that the lesion usually gets beyond control, and usually goes on to wide destruction of the kidney and extension to the other kidney, to other parts of the urinary tract and of the body.

3. Remissions are common.

4. The symptoms are misleading and give no indication of the extent of the lesion.

5. The diagnosis may be very difficult and require preliminary treatment and repeated cystoscopic examinations. Remissions may occur. In the treatment the ef-

forts of nature to inhibit the disease should be remembered and encouraged both in the inoperable cases and

6. Nephrectomy for unilateral tuberculosis is the proper

Resultats Eloignes Experimentaux et Cliniques des Sutures Nerveuses (Late Results of Nerve Sutures)

November-December, 1917.

The question of nerve sutures is still undecided. Rapid cures are to be doubted because the true cures are slow to appear. In any case only the late results are to be considered.

In determining the results of a nerve suture many factors are to be considered, most important the rapid wasting of the muscles and the sclerotic atrophy of the terminal nerve corpuscles.

The paper contains a number of points which are interesting from a technical point of view.

War Surgery. J. J. MOORHEAD, *Journal American Medical Association*, August 11, 1918.

Moorhead gives an account of operations performed on 132 patients during the recent spring offensive in the present war. The summary is detailed and his conclusions in substance are as follows: No patient should be operated on until thoroughly warmed unless bleeding is uncontrollable. Patients coming in with a tourniquet, with or without severing of main vessels, are bad risks, as gas gangrene is likely to have developed, and the wound in such cases should never be closed. Any unusual rise of temperature or pulse, especially if associated with restlessness, calls for immediate attention on account of the risk of gas gangrene. Persisting high temperature and pulse almost always mean that the wound is not doing well, unless pneumonia or some other acute systemic condition can be positively shown. Freedom from subsequent infection is directly in proportion to the removal of damaged tissue. Persisting shock usually indicates hemorrhage. Ether has shown an unusual efficacy when employed to lavage wounds during and after operation, especially when muscle tissue is much involved. Postoperative dressings should be moist for the first few days at least. Drainage will cause infection if used for more than forty-eight hours, especially if rubber tubing is employed in parts subjected to movement, such as the abdomen or chest.

Les Plaies du Crâne dans les Ambulances du Front. (Head injuries at the front.) ANSELME SCHWARTZ, *Revue de Chirurgie*, July-August, 1917.

There are (1) crushing injuries, produced by large missiles, which are only superficial or are very extensive and severe, with and without opening of the dura; (2) penetrating injuries, including through-and-through wounds, produced by rifle bullets and productive of vast destruction in the interior of the skull.

The brain lesions are nearly always serious. A bad prognosis is made under these conditions: penetrating or through-and-through, or extensive crushing injuries; retention of missile in the brain; escape of cerebral tissue; degree of coma is deep; contractures with or without paralyses or twitches; marked sweating; plantar reflexes in extension. Jacksonian attacks may be temporary, and may be due to a too tight dressing. Meningeal reactions are frequent. Escape of cerebrospinal fluid has not necessarily bad effect. Brain hernia can occur immediately—and then they usually indicate a grave outlook—or can occur between the 15th and 20th day. In the latter case they may regress later.

Operation is made on every patient unless the wound is without doubt superficial or the patient is moribund. Local anaesthesia is almost invariably used. The wound is cleansed and enlarged, splinters are removed, the entire wound opening up. The dura is opened only on clinical or local findings and only in a healthy field. Drainage is employed practically always. Missiles are removed when large and comparatively easy of access under guidance of the x-ray and by following the course of the bullet.

A Step Forward in the Use of the Army Litter. FIRST LIEUT. GEORGE B. KENT, *Journal of the Indiana State Medical Association*, May, 1918.

Attention is called to the fact that the army litters, as at present used, make no attempt at immobilization of the injured. Methods are described of immobilizing parts or the entire body of the wounded man on the stretcher which is then used as a splint.

Factors Determining Mortality in Prostatectomy. IRVING SIMONS, B.S., M.D., *Interstate Medical Journal*, June, 1918.

Few, if any, and perhaps no prostatectomies are urgent. The secondary symptoms of prostatic obstruction should be relieved, if possible, before the patient reaches the operating table. This is really a preparation of the kidney for the sudden (operative) relief of back-pressure to which it has become more or less accustomed.

The infected bladder should be cleansed as far as possible.

Delay in operation is always advisable in the presence of complications of fever that cannot be explained, as this may be due to pyogenic infection of the kidney.

The one-stage operation with preparation is preferred in most cases where the two-stage operation is usually said to be indicated.

Re-education in the Functional Disabilities of Active War Service. WILLIAM WARD PLUMMER, M.D., *The American Journal of Orthopedic Surgery*, July, 1918.

A Re-education Department is very necessary and useful in the conduct of Reconstruction Centers as we know them in the present war.

The personnel of such a department requires very careful selection, and its direction should be undertaken by a man who is keen for the work, and alive to the subject of what might be called "functional anatomy." If possible, he should be a civilian practitioner rather than an officer in uniform, his relations with the men being much simpler and conducive to less restraint.

It does not seem to the writer that the recovered cases are suitable for return to active front line war service, but should be classified for other duties that would assure the man against a return to the actual fire zone. These cases appear to be very "unstable" and relapses may occur from apparently trivial causes.

An Operation for the Relief of Pyloric Obstruction in Infants. EDITH C. CHICK, *Surgery, Gynecology and Obstetrics*, August, 1918.

The operation is a modification of the Rammstedt operation in which the defect left after dividing the thickened wall of the pylorus is closed by a modified peritoneal flaps taken from the immediate neighborhood.

Transfusion of Blood in Septicemia of Long Duration. C. MCKENNA, *Surgery, Gynecology and Obstetrics*, August, 1918.

The author comments upon the value of blood transfusion in septicemias of long duration and illustrates with a case report. In these cases the blood injection acts probably as a hematopoietic stimulant.

Exfoliative Vaginitis. WILLIAM KERWIN, *Surgery, Gynecology and Obstetrics*, August, 1918.

This is rare affection characterized by the production of a superficial necrosis of the vaginal mucosa. The process manifests itself in the expulsion of a complete cast of the vagina or of more or less extensive pieces of mucous covering. Microscopically the discharged specimens are composed of vaginal epithelium and result from some thermic or chemical irritation. In several cases reported, however, no such etiology could be found.

Esophageal Diverticula. E. S. JUDN, *Surgery, Gynecology and Obstetrics*, August, 1918.

The infolding operation in the case of small diverticula and a two stage operation in large diverticula seem to be the most satisfactory and safe methods of procedure in all cases of esophageal diverticula. The results were very gratifying. In a series of 35 cases only two underwent a fatal issue.

AMERICAN JOURNAL OF SURGERY

VOL. XXXII.

DECEMBER, 1918

No. 12

THE POST-OPERATIVE TREATMENT OF ABDOMINAL CASES.

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The ordinary case with an uncomplicated operation goes from the operating table in good condition. The less treatment the patient receives after laparotomy the better. There is a slight degree of depression, scarcely worth being called shock, which requires only that the surface of the body shall not become cold. The patient should be taken to a quiet, not too light room, and laid supine until the anesthetic depression has subsided. Then the head may be elevated. There will be some abdominal pain, some thirst, some nausea, and some insomnia the first night. These usually are of so little consequence as to require no treatment. As soon as the nausea has subsided, which should be by the day after the operation, the patient may be given fluids by mouth and the elevated head position should be instituted. The head may be elevated so that the trunk inclines at an angle 45 degrees above the horizontal. By the second day milk may be taken if all nausea has subsided. After this the diet may be steadily increased.

The *elevated-head position* may be maintained as much as the patient desires through the day. For sleep he should endeavor to lie supine with a pillow for the head. For maintaining the elevated-head position the head of the bed may be raised or an inclined plane placed behind the back. To prevent the patient from sliding down in bed a second inclined plane may be connected with the first. The second plane should accommodate itself to the thighs and legs the apex being at the knees. An exaggerated position is not called for. The elevation should be about 45 degrees above the horizontal. It need not be more than this. Raising the head of the bed 45 or 50 cm. (18 or 20 inches) on two chairs suffices. A pair of pillows below the buttocks may be fixed with a bandage to prevent the patient sliding downward.

The patient may be allowed out of bed in a chair on the eight or tenth day; at the end of two weeks he may be allowed to help himself out of bed; and in twenty-one days he may be permitted

to go about his business. In the case of wounds which have been drained, the patient should not be allowed to walk until the wound is entirely healed.

Special treatments are advocated by many surgeons. In some hospitals certain routine measures are followed in all cases. This is necessary only in such institutions as can not guarantee intelligent supervision over post-operative cases. In the presence of discriminating supervision, each case should receive the treatment indicated for that particular case.

The placing of a *rectal tube* after the patient has been put to bed gives comfort in many cases. It may be left in for two days. If it causes discomfort, some olive oil injected through it will soothe the bowel. The tube permits the escape of gas without muscular effort. It does no harm and may be of great benefit.

J. A. Sampson conceived the idea of *increasing abdominal pressure* by means of sand-bags placed on the abdomen. Sand-bags measuring 15 by 30 cm. and weighting 2 to 3 kilos (5 pounds) are used. These sand-bags are made flat and sewed through to keep their shape. Two bags are placed on the abdomen, one on either side of the median line, and held by the binder. The weight of the bags causes slight compression of the abdominal blood-vessels, distension of the intestine is counteracted, gas is caused to move onward toward the anus, and the patient has a sense of comfort and security. After the removal of large tumors or large amounts of fluid, this treatment is indicated.

The use of *morphin* after abdominal operations requires discrimination. If a patient is not going to have pain or shock, it is not necessary. It may be given as a routine in doses of 0.005 gm. (1/12 grain) every three hours while the patient is awake during the first two days. As a rule the patient is better off without it; but as a rule morphin will do less harm than pain, restlessness, and sleeplessness.

It is not necessary that most patients should have a *bowel movement* on the second or third day, after the operation. Usually if left alone the bowels will move by the fourth day. If the patient is doing well, there is no harm if the bowels do not

move till the fifth or sixth day. A dose of paraffin oil may be given if necessary. A particularly effective cathartic at this juncture is a dose of 45 c. c. (1½ ounces) of castor oil and 4 c. c. (1 dram) of compound tincture of cardamon.

The post-operative administration of oxygen, begun immediately, hastens recovery from ether and diminishes the liability to vomiting. The inhalation of the fumes from vinegar relieves the ether nausea.

Post-operative complications, requiring treatment, arise in many cases. They may be mild or so severe as to threaten life. None of the measures, described below are needed in the ordinary uncomplicated case.

Vomiting and nausea have an intimate relation to the anesthetic. It is possible to employ anesthesia that will not cause vomiting. Taking fluids too early into the stomach should be guarded against. Vomiting is easily excited after ether anesthesia. Commonly it is due to the reflex or direct mechanical disturbances incident to the operation. Vomiting is least apt to occur if the minimum of damage has been done to the bowel during the operation. If the vomiting is anticipated in a patient who has had ether, it may be prevented by passing the stomach tube before the patient regains consciousness and washing out the stomach. This may be repeated if nausea develops.

Nausea due to abnormal peristalsis may be serious. By placing the patient in the elevated-head position, downward drainage may be established. An evacuation of the bowels, secured by enema, will often stop the nausea. When vomiting of the contents of the small intestine is troublesome, lavage of the stomach is essential. This should be repeated as many times daily as necessary.

The surgeon should assure himself that there is no intra-abdominal condition which should be relieved. Gauze or other drainage material may cause irritation to the bowel and reflex vomiting; or it may be responsible for actual mechanical obstruction. A collection of pus may have been overlooked. Very commonly persistent vomiting is due to a spreading peritonitis, and will not subside except by direct treatment of that condition. Vomiting which is intractable is usually due to peritonitis or intestinal obstruction, and the surgeon should address his attentions to these conditions rather than to the stomach.

It is rarely worth while attempting internal medication for nausea. Counterirritation of the skin of the epigastrium by mustard is of help in some nervous cases. Fresh cool air admitted to the

lungs, or the inhalation of oxygen, sometimes give relief. Gastric lavage should always be regarded as the main reliance of treatment.

Meteorism or gaseous inflation of localized segments of bowel should be prevented by the precautions already described. Minimize the damage to the peritoneum and bowel. Pre-operative purgation is a common cause. Hot water by mouth in 4 c. c. (1-dram) doses, as hot as the patient can bear it, will bring up gas. By elevating the upper part of the trunk, placing the patient in the semi-upright position the expulsion of gas is facilitated. The relaxed abdominal muscles may be caused to contract and press out the gas by applying heat. This may be in the form of hot stupes, or dry heat. The latter may be applied by means of the hot-air box.

A distended large intestine requires relief by an enema and the restoration of peristalsis. If the ordinary enema of soap and water does not accomplish it, a more stimulating one should be used. Turpentine, 4 c. c. (1 dram) to 500 c. c. (1 pint) of water, may be added. Powdered alum in the same amount may be used. A combination much employed is made of magnesium sulphate, 30 gm. (1 ounce); glycerin, 30 c. c. (1 ounce); turpentine, 4 c. c. (1 dram); and water, enough to make 120 c. c. (4 ounces). J. C. Munro recommended a mixture of 500 c. c. (1 pint) of milk, 500 c. c. (1 pint) of molasses, and 15 c. c. (½ ounce) of turpentine. A tube may be passed occasionally to assist the expulsion of gas.

For meteorism, the alum enema is most effective. The important thing is that gas shall be expelled. When the measures for the treatment of meteorism and vomiting fail to give relief in twelve hours, the surgeon should realize the strong probability of spreading peritonitis or obstruction being the cause of the trouble.

Eserin salicylate in doses of 0.001 to 0.0015 gm. (1/60 to 1/40 grain) is useful in some cases. It acts only on the small intestine and an enema should be given four hours later to empty the large bowel. Hormonal in doses of 15 to 20 c. c. (4 to 5 drams) is perhaps still more effective, as it acts on the whole intestine. Neither of these should be given in well-developed peritonitis or obstruction.

Nothing so effectively stimulates peristalsis as food. It should be given as soon as the stomach will tolerate it. It will be found to be the best gas eliminant.

Acute dilatation of the stomach may be prevented, diagnosed and cured by the stomach tube.

Pain following operation usually subsides with the meteorism. During the first night it may be so severe as to justify an injection of morphin. The drug is best not to be repeated.

Shock in a slight degree needs only the ordinary post-operative care of the patient. Its degree can not always be predicted, and it is a wise rule to be prepared for it in all cases. Its treatment in abdominal cases is not much different from that in other cases. *Proctoclysis*, the slow instillation of warm glucose or salt solution into the rectum, is of special service in shock of abdominal origin. If the patient can take water by mouth it is better so given.

Some surgeons combat shock by filling the peritoneal cavity with warm saline solution. This is best done by placing a soft catheter behind the omentum, or through it if preferred, so that its tip lies above the transverse mesocolon. The peritoneum and transversalis fascia are snugly closed about the catheter. Saline solution at a temperature of 45° C. (112° to 114° F.), is then allowed to run in from a height of about 1 meter. Five hundred or 1,000 c. c. (1 or 2 pints) will fill the abdomen. The tube is then withdrawn and the closure of the wound completed. This treatment gives heat and pressure to the region of the hypogastric and solar plexuses, and vasoconstriction results.

A routine practice of some surgeons is a method advocated by Clarke for filling the large bowel with saline solution. At the conclusion of the operation, while the abdomen is being closed, the patient is placed in the lowered-head position, 1 to 2 liters (1 or 2 quarts) of warm saline solution are allowed to run into the rectum. This fluid passes through the whole large intestine. Clarke employs this method after the treatment of peritoneal adhesions, before closing the abdomen, and is able to see the fluid pass as far as the cecum and sometimes into ileum, and the colon drop back into its normal position by the weight of the water. If the patient is carefully handled, and the pelvis kept slightly elevated, the fluid is retained, and absorbed. The value of this treatment is very doubtful.

Heat applied to the abdominal wall, has the effect to increase salutary hyperemia and peristalsis. A. Stempel advocated heat by means of the hot-air box or the incandescent electric-light box—500 candle-power. It is claimed that it counteracts the tendency to shock, promotes peristalsis, diminishes adhesions, and inhibits peritonitis. A dry air temperature of 130° C. (265° F.) may be used for fifteen or twenty minutes twice daily. A temperature

of not more than 55° C. (131° F.) may be used for one or two hours at a time, with intervals of three hours, day and night. Other surgeons use it only once or twice a day. Without any other post-operative treatment it is found that flatus is usually passed during the first twenty-four hours.

Thirst, after laparotomy, is sometimes distressing. If the patient is not nauseated he may drink freely of water that is not cold. If the patient is still nauseated, thirst can not be slacked with drink. Ice may be taken into the mouth, or the mouth rinsed with a cooling taste of lemon juice. The treatment of thirst consists in supplying fluids to the tissues; and this is done by proctoclysis, hypodermoclysis, infusion, or the other means described for restoring body fluids. It is not wise to give a vomiting patient fluids which do not quench the thirst and which do aggravate the vomiting. It should be remembered that water is not absorbed, by the mouth, stomach, or even the upper part of the intestine.

Retention of urine should not be confused with scantiness of urine. After the laparotomy the secretion of urine is diminished. If the patient is kept dry about 360 c. c. (12 ounces) are passed the first twenty-four hours. This should be increased by the use of water by mouth and salt solution to at least 500 c. c. (1 pint). If urine is not voided in the first eighteen hours, some artificial encouragement should be given, such as a warm enema or hot application to the pudendal and pubic regions. If these fail, and the patient feels that urine could be passed in the sitting or standing position, it may be tried. With a firm adhesive strapping to support the wound, the patient can do it no harm by standing up to urinate.

The passage of small quantities frequently means injury to the bladder, or in indicates the overflow from a full bladder which should be catheterized. Catheterization otherwise should be reserved as a last resort. A record of the amount of urine voided should be kept. The catheter should be passed carefully. For lubricating the catheter a safe mixture is 25 per cent. argyrol in glycerin.

Other complications which may arise require their own treatment. Post-operative hemorrhage, peritonitis, ileus, acute dilatation of the stomach and phlebitis, may require attention. Post-operative hiccough is to be combated by removal of the cause (usually peritoneal irritation) and by sedative measures.

Acidosis should be treated by sodium bicarbonate and the other alkalis by mouth, and in severe cases by rectum and intravenously.

The patient should be treated by giving the patient fresh air. The shoulders should be slightly elevated, concentrated nourishment should be given, the surface of the body should be protected from chilling, and nothing should be permitted that depresses the heart. It is possible that some day these cases may be saved from a fatal termination by insufflation of the lungs with fresh air. Pneumonia is to be prevented, by sparing the patient from exposure to cold before, during, and after the operation; by careful anesthetization; by cleanliness of the mouth; by having the patient breathe deeply as an exercise two or three times a day after the operation; and in the case of old people, by avoidance of the recumbent position.

Remarks—In general, most abdominal cases require no special treatment. It is best that the patient should not be pestered with attentions. A small dose of morphin the day of the operation and, if at all indicated, the night following the operation should make the patient comfortable. The character of the operation and the amount of traumatism that has been inflicted are the chief determining factors. The patient should be allowed to change his position as he will. The most comfortable position is the most restful. Catharsis before and after operation is to be avoided if possible.

The time for getting up after abdominal section must depend upon many conditions. A clean undrained abdominal wound is well united in ten days. The sutures may be removed on from the eighth to the tenth day. Broad adhesive straps should support the wound and hold on the dressing. With such adhesive straps a comfortable patient may be allowed up in a chair any time from the seventh to the tenth day. No harm need be done by sitting up even earlier. Weak patients should remain in bed longer.

An average healthy patient may be permitted to walk two days after he begins to sit up. The adhesive straps which support the abdominal wound and prevent strain upon the union should be worn for a month. Care should be taken that the patient abstains from straining for two or three months.

Post-operative feeding must vary for each patient and the nature of the operation. In operations not involving opening the alimentary canal, water in small doses may be taken after twelve hours. On the day following operation fluid nourishment which is least prone to fermentation and putrefaction may be given. Whey, broth, strained soups, orange juice, grape juice, lemonade, peach juice, malted milk, albumin water, and glucose solution may be

given in small doses. At the end of forty-eight hours, if no signs of peritonitis are present, milk may be added. A small glass of milk (120 c. c.) may be given every four hours during the third day after the operation, and this amount may be doubled on the next day. Milk may alternate with the other fluids. Solid food, such as cereals, dry bread and soft egg may be allowed on the fourth day, and if no complications develop, full diet may be permitted on the fifth day. All food should be in moderate amounts. It should be well chewed. And the patient should preferably eat what tastes good.

For *emergency feeding*, when the conditions are not normal, when the patient can not be given the above diet, and nourishment is necessary, other expedients must be employed. These are intravenous, subcutaneous and rectal nourishment.

THE SUCCESSFUL SECONDARY SUTURE OF ULNAR NERVE; A CASE OF TOXIC NEURITIS.

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Nelaton (1865) was probably the first to perform successful secondary suture of a completely divided nerve. The operation has since been duplicated hundreds of times, both with and without mechanical aids, depending upon the extent of nerve destruction. Scrutiny of case records appearing in available literature shows a satisfactory outcome in over seventy-five per cent. of instances.

While, theoretically, primary neurorrhaphy would seem most logical and should prove uniformly satisfactory, yet, practically, the operation is not always more successful in its ultimate results than secondary suture. Some remarkable instances are recorded in the older literature where complete restoration of physiological nerve function followed secondary neurorrhaphy; e. g., those of Busch, Holmes and Esmarch, after suture of the radial at three, five, and sixteen months; those of Hulke and Jessop, of the ulnar after four months, and nine years; those of Krausold, Tillaux and Langenbeck, of the median after two, four, and eight months; that of Brenner after ten years; another of Tillaux's after fourteen years; and that of Simon of the median and ulnar nerves after ten months. After the majority of these operations sensibility speedily returned, but the period required for restoration of motor function was much longer—the earliest sixteen days, the longest three years, the average being between nine months and one year.

A greater percentage of successful results from both primary and secondary neurorrhaphy has been made possible by an increase in diagnostic acumen, improvement in operative technic, the perfection of mechanical aids, and a better understanding of the importance of aseptic methods. An unsuccessful outcome in nerve suture may accrue from one or more of the following factors: (a) failure to resect sufficient intraneural connective tissue in the proximal segment, (b) failure to control intraneural hemorrhage, (c) too deeply inserted sutures in closing the nerve sheath, (d) the use of a section of vein or fascia in areas of pre-existing cicatricial tissue, (e) infection, (f) a nerve defect too extensive to permit of repair excepting by tissue transplantation.

In my opinion end-to-end suture with fine catgut is the method of choice, whether operation be undertaken primarily or secondarily, provided the nerve ends can be sufficiently freed to make immediate union possible. Great care should be exercised to prevent infection; and hemostasis must be perfect to insure a satisfactory outcome. Where the nerve defect is too extensive to permit of immediate suture, homo or autoplasmic transplantation may be undertaken. I have had no experience with any of the mechanical devices recommended for facilitating nerve suture, although their utility is unquestioned and excellent results have been reported from such methods of procedure.

A girl, aged eleven years, came under my observation and was operated upon May 2, 1918. Six months previously, i. e., in December, 1917, while attempting to open a fruit jar the glass broke and a sharp fragment divided the flexor tendons and the ulnar nerve of her left hand. Primary operation performed by another surgeon was not entirely successful as the first two and about half of the third finger had been paralyzed since the accident. There was considerable contraction of the fingers, and the wrist was maintained in a flexed position.

A free incision was made and the tendons dissected from the ulnar nerve, some granulation and cicatricial tissue which had formed between the nerve ends being removed. The distal and proximal ends of the nerve were located, the latter being found adherent to one of the tendon sheaths. Whether it was sutured to the tendon during the original operation I do not know. The nerve ends were dissected free for some distance to secure healthy tissue, and end-to-end suture then performed with No. 1 plain catgut. A flap of fat was obtained from the abdomen with which the anasto-

motic area was enveloped to prevent future adhesion to the tendon sheath which had been liberated.

An interesting feature to me, although my experience in this particular line of work has been limited, was that the next day some motion was noted in the first two fingers, sensation not appearing until three weeks later. I believe this is contrary to the rule in such cases. The operation was performed six months ago, and both sensation and motion are now perfectly restored.

The after-treatment consisted in the application of heat, light massage and passive motion after the wound had healed, followed by gradually increasing active movement to stretch the flexor tendons and develop the atrophied muscles.

Nerve suture, if performed immediately after receipt of the wound, says Pitres, is a logical operation, because by obviating separation of the wound lips and exuberant production of connective tissue it facilitates the passage of young fibrils of the central end toward the peripheral end of the nerve; but however easily and thoroughly this operation may be performed, it does not prevent degeneration of the fibers of the peripheral segment. Late suture seldom gives favorable results, because it cannot be performed without causing profound disturbance in growth of the fibers which occurs at the extremity of the central end. *A fortiori* is resection of the central end contraindicated excepting in rare instances; it is seldom of use and generally harmful, because it destroys the histological process which has occurred in the zone of growth of new axones. In view of the inevitable degeneration of the lower segment even when sutured immediately, the opinion that occasionally immediate and ultra-rapid functional return of a divided nerve occurs is ill-founded and rests on errors of interpretation. Among the observations which have been brought forward in its favor, there is not one which can bear searching criticism. (Pitres.)

Dejerine also thinks rapid recovery of motility occurring one or two days after suture of the nerve is absolutely incompatible with clinical, anatomical, and pathological experience. The author makes the positive statement that it has neither been observed after primary suture performed immediately after injury, nor in secondary suture performed at a later date. After nerve section the peripheral end of the nerve always degenerates throughout its whole extent. If rapid motor recovery does not exist from a histological point of view, how are we to interpret the so-called rapid recovery which has been clinically confirmed a day or two after nerve suture? When these cases are critically investi-

gated they are always found to be inaccurate and to lack clinical precision. (Dejerine.)

According to the view of Keogh in divided or completely crushed nerves, suture performed directly after resection generally gives the best results. In complete anatomical section with separation of the two ends the lower extremity of the upper neuroma must be pared away, as it is formed by fibrous tissue which opposes the advance of axis-cylinders. Resection must be extended beyond the zone of indurated tissue, but excessive shortening of the central end would necessitate pulling the nerve to allow suturing, or require application of a nerve graft, which is not to be recommended. Resection is also necessary because the extremity of the central segment often shows torsion with horizontal arrangement of the fibers, which constitutes an impenetrable obstacle to the regenerating axis-cylinders. The upper portion of the lower pseudoneuroma likewise must be resected, since it is also composed of fibrous connective tissue. When the two extremities have been freshened they should be sutured end-to-end. The following is the method employed by Gosset; approximate the two extremities by catgut, then unite the neurilemmas by several fine silk sutures, taking care not to draw the two cut ends too tight, so as to facilitate the advance in a straight line of the axis-cylinders of the central end. (Nageotte.)

Any operation must be regarded as illogical, says Keogh, which involves any doubling over of one or other of the nerve segments, also bayonet suture, and especially grafting the central end to a healthy neighboring nerve, or the peripheral end to an adjacent mixed nerve. Where the interval between two nerve extremities is too wide to permit direct suture, the two ends may be joined by the interposition or grafting of a segment of another nerve. However, the results of nerve grafting which *a priori* appears to be a logical procedure cannot yet be appreciated since regeneration is fraught with difficulties and takes place slowly. Sicard has suggested neuro-vascular auto-grafting by transplanting the segment of a neighboring nerve, preserving a large pedicle of vascular and connective tissue. This procedure would seem applicable where there was a healthy sensory nerve in the neighborhood. (Keogh.)

Dumas has performed a considerable number of nerve sutures and a larger number of "freelings." He found recovery of movement did not occur until late, but the point which impressed him most was that there existed a definite individuality in the nerves from the point of view of the rapidity and

completeness with which they regained their motor power. The musculo-spiral regenerates readily, and the ulnar slowly; while the great sciatic (especially the internal popliteal) and the median give the most disappointing results.

Tinel has compiled statistics covering one hundred and eight cases of suture or nerve grafting, and shows only twelve to fifteen per cent of failures.

Gosset has reported one hundred and twenty-six cases of nerve suture of which twenty-five were performed by means of nerve grafting. The results appear to him encouraging, and he ascribes the failure of suture "to the fact that nerve resections have been too restricted, and that the suture had involved sclerosed portions of the nerve and for this reason was doomed to almost certain failure."

One hundred and fifty operated cases are cited in statistics presented by Keogh, who concludes:

(1) That exploratory incisions carefully performed under aseptic conditions are not harmful to injured nerves:

(2) That freeings do no harm and may favor recovery:

(3) That herbage of neuromata does no harm:

(4) That sutures for complete section of nerves performed six to eight months after injury often results in cure in the musculo-spiral and external popliteal:

(5) That resection followed by suture in severe lesions of the same nerves gives equally good results when the operation has not been too long postponed—eight months at the very utmost after injury:

(6) That sutures or resections followed by sutures of the ulnar nerve regenerates far less quickly and are altogether less satisfactory; those of the great sciatic and the median also regenerate extremely slowly; frequently twelve to eighteen months after operation there is no return of nervous function, or only a slight degree of recovery.

Instances of toxic (or autotoxic) neuritis are observed with sufficient infrequency to make isolated case reports of some interest. The disorder seems to have been first described by Graves (1828), but credit is due more recent authors for the major portion of our present knowledge of the subject.

Toxic neuritis more often than otherwise develops as a complication or sequel of one of the various infectious diseases, e. g., diphtheria, influenza, typhoid fever, smallpox, scarlet fever, measles, pneumonia, pertussis, crsipelas, arthritis, malaria, etc. It is a not infrequent concomitant of all forms of septicemia,

and may be strictly autotoxic when occurring during the course of diabetes, tuberculosis, carcinoma, syphilis and Neisserian infection. The disorder is comparatively rare in young children, and almost unknown in advanced age.

The lower extremities are most frequently affected, and the case to be reported corresponds to the rule—the child being unable to walk or stand without assistance. I am aware of no other instance, however, where an individual has been the subject of repeated attacks of toxic neuritis, and in that respect the case appears unique.

A girl, aged ten years, was sent to Louisville by the family physician from the interior to Kentucky to consult an eye, ear, nose and throat specialist who had removed the child's tonsils three years previously. Finding no pathological condition about the nose, eye or throat, the specialist referred the patient to me under the impression that the case might be surgical, as the child was unable to stand or walk.

According to the history obtained this was the third attack of similar nature which the child had suffered, the intervals between attacks being about twelve months. While I am unfamiliar with the previous history, the mother stated the child was unable to walk on two previous occasions, and that was true in the present instance.

This girl presented a rather peculiar and unusual clinical picture. She had hyperesthesia of the lower extremities, with loss of all the reflexes; pupils and pupillary reaction normal; she had complained of no acute pain at any time; for two weeks she could not speak above a whisper. She developed an extreme degree of weakness of the lower extremities without definite evidence of paralysis. Radiographic examination of her spine and pelvis was made, because she had consulted an osteopath who stated that she had a "dislocated vertebra," but nothing abnormal was shown by the plate. The Wassermann blood reaction was negative. The feces and urine were examined and nothing abnormal found. Analysis of the blood showed sixty per cent. hemoglobin, otherwise it was practically normal. There was also considerable tenderness on pressure over the peroneal and tibial nerves. There had been no elevation of temperature, and barring her inability to walk the child was apparently well.

The present attack followed measles, but the history of the inception of the two previous attacks is not very clear. However, the mother stated the child had scarlet fever and influenza one and two years ago respectively and was thereafter unable to walk for several weeks. Dr. C. W. Dow-

den, who saw the patient with me in consultation and was instrumental in having the laboratory investigations made, concluded that she had toxic neuritis in which I concurred although the history was somewhat obscure. Another gentleman who also saw the patient suggested that the manifestations might be due to hysteria. I always hesitate about making a positive diagnosis of hysteria under any circumstances because disastrous results have sometimes followed such conclusions.

Obviously no surgical treatment was indicated in this case, and while there may be some uncertainty about the cause of the disability, recovery having followed expectant treatment on two previous occasions, the prognosis seems favorable. I recommended that the child be given a tonic of iron, arsenic and strychnia—thorough elimination, hot baths and massage. The patient has now been under observation ten days, and while motion of the lower extremities seems somewhat improved, she is still unable to stand or walk.

According to Martin, the most common form of neuritis is a simple inflammation of a nerve or set of nerves, localized, and its cause can usually be traced to one or more of several factors, viz.: cold, traumatism, sepsis, occupation, cachexia, or from extension of an inflammation from an adjacent part, such as caries of a tooth, etc. The acute stage shows inflammation with redness and infiltration of the surrounding tissues. The inflammation may be interstitial with an accumulation of lymphoid elements between the nerve bundles. In this type the inflammatory process extends into the deeper parts of the nerve. The usual form is the perineural. In the parenchymatous type changes occur similar to those noted in secondary or Wallerian degeneration, the nerve fiber being separated from the cell body of the neurone to which it belongs. The pathology, according to this author, is that "the myelin becomes segmented and divides into small globules and granules, and the axis-cylinders become granular, broken, subdivided and finally disappear. The nuclei of the sheath of Schwann proliferate, and ultimately the fibers are reduced to a state of atrophic tubes without a trace of normal tissue or structure." This atrophy extends to the muscle supplied by the nerve, producing marked changes in the interstitial muscular tissues, in some cases only local in character. Electrotherapeutic methods of treatment are advised by Martin in the treatment of the various types of neuritis. "In every case no effort must be spared to eliminate toxins, and in this connection a milk diet is of special assistance; weakly convalescents

ought to be especially guarded against fatigue, excitement, or mental depression." (Perrin.)

The following interesting data are abstracted from Dercum's classical paper on neuritis published several years ago: The development may be gradual or rapid; it may or may not be attended by fever; it may involve the nerves of both legs, of both arms, of all four extremities, of the trunk, and of the head and face. Sometimes the motor fibers are especially attacked, and in such cases paralysis is the most prominent symptom; at other times the sensory fibers are especially attacked, and in such cases pain is the most prominent symptom. Again, both motor and sensory fibers are attacked, and in such cases both paralysis and pain are present. All varieties of mixed motor and sensory involvement may be noted: thus motor and sensory phenomena may exist in about equal proportion, or motor phenomena on the one hand or sensory phenomena on the other may predominate to a lesser or greater degree. The motor disturbance, instead of consisting of muscular paralysis or weakness, may consist of inco-ordination, and this symptom may resemble that observed in tabes. Involvement may be diffused or limited in extent; usually corresponding or homologous parts are involved, but this is not always true. Various sensory disturbances may be noted, such as numbness, paresthesia, tingling, pricking, hyperesthesia, hypesthesia, or anesthesia; also various trophic disturbances, such as atrophy of muscles, changes of electrical reaction, contractures, glossiness of the skin, lividity of the skin, edema, local sweating, arrest of growth in the nails, rarely ulceration; the tendon reflexes are usually lost early; the skin reflexes may persist, may be exaggerated, or may be lost. The attack commonly begins slowly and without fever; the nerves of the lower extremities are attacked by preference. The first symptoms noted are usually paresthesias, such as tingling, pricking, numbness in the legs and feet; after a lapse of a variable period of time diminution of muscular power in the legs is noted; pain becomes more pronounced and weakness slowly progresses; soon walking becomes difficult.

The various infectious diseases give rise to widely diffused neurites, both motor and sensory; these may be noted in the postfebrile period of typhoid fever and of other exanthemata, such as measles. Influenza may give rise to neuritis widely diffused and largely sensory; diphtheria may give rise to a motor neuritis characterized, as is well known, by an involvement of the soft palate, at other times by a widely diffused involvement giving rise to diphtheritic ataxia; septicemia may give

rise to a neuritis widely diffused or more or less localized according to the special etiology, and which is both motor and sensory. Tuberculous neuritis, which is rare, is sensory in type. Malarial neuritis, which is also rare, involves the legs most frequently.

In the treatment rest in bed is imperative. The limbs should be so placed as to be neither excessively flexed nor unduly extended, and should be supported upon soft pillows, or better still, if they be very painful, upon cotton-bating kept in position by flannel bandages or by splints; in other cases flannel bandages alone, if not too firmly applied, give considerable comfort. Drugs for relief of pain should be used with extreme caution. In clearly toxic cases the free administration of diaphoretics is indicated for their eliminative effect. The ingestion of large amounts of water also favor free diuresis and may be decidedly beneficial. Aspirin and the various salicylates may be given with advantage in the earlier stages. In cases of average severity weakness of the extremities, pain and hyperesthesia may persist for weeks or months, and during this period mercuric chloride or potassium iodide will be found of benefit. Where loss of weight is marked and anemia develops, iron, cod-liver oil, malt and other nutrients are indicated.

The principles of the rest cure should be applied as far as may be possible—full feeding should be resorted to, milk and eggs in increasing quantities; and as pain and hyperesthesia subside massage should be employed. Later when nothing but muscular weakness remains, heat, massage and electricity should be used. The slowly interrupted faradic current is indicated in most cases, and the extensor muscles should receive especial attention. (Dercum.)

SYMPHILIS AND OPERATIONS ON THE NASAL SINUSES.

In suppurative conditions of the nasal sinuses if there should be any question of the existence of syphilis, operative work must be undertaken with caution, since under antisyphilitic treatment many cases have been cured or have satisfactorily improved without operative interference. Many cases could be quoted to prove this. It may be said, therefore, that where there is a positive Wassermann reaction wait, if possible, until a course of specific treatment has either cured the sinus disease or made the necessity for operation clear.—BRYSON DELEVAN in *Proceedings of the American Laryngological Association*.

INDIVIDUAL ENUCLEATION OF MULTIPLE PELVIC TUMORS VERSUS THEIR MASS REMOVAL.

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Large multiple fibroids, complicated or uncomplicated with ovarian or tube-ovarian cysts, present one of the most difficult of intrapelvic operative conditions. Frequently the retroperitoneum is utilized as the chief covering of the laterally and posteriorly located tumors. Such peritoneal misplacement produces a ureteral and sigmoidal displacement. The cohesive pressure between growing tumor, small bowel and caput coli incites adhesions between them, with consequent fixing and location of large and small bowel in an abnormal position. The vesicae fold of the peritoneum ex-

indicates inoperability because of the necessary length of the operation and the resulting shock.

It is my opinion that such retroperitoneally covered tumors can be operated upon successfully by a system of individual tumor enucleation with sequential dealing with their erstwhile covering. This surgical deduction is based upon my observation that practically all multiple fibroid tumors have an area of obliterated blood supply at some one point, due to the intracapsular tumor pressure: that this area of blood supply obliteration is always at the point of greatest tumor protusion. Further, that the lateral and posterior areas of fibroid tumor coverings alone seemingly contain the active blood supply. Next, that all such tumors, as well as ovarian cysts, have a line of cleavage area of their peritoneal covering, which line of cleavage when sought, found, and utilized will permit the rapid enucleation of the individual tumor from its peritoneal covering without the latter's simultaneous removal. The remaining sagging sac of peritoneal covering can be easily removed or infolded, after



FIG. 1.

Case No. 1. Mary S.—aet 46. The central mass is the uterus redundant retro peritoneal coverings, and surrounded by the multiple fibroid tumors varying in size from small lemon to small oval head.



FIG. 2.

Case No. 2. Molly H.—aet 45. The central large mass is the uterus with fibroids, the two large lateral tumors were tubo-ovarian cysts. The posterior large tumor was a very large cul de sac located tumor.

tends only too frequently over the anteriorly located tumors, bringing with it the bladder, and at times each of these—tumor and bladder—through intra-abdominal pressure become fixed to the anterior abdominal wall. When such adhesions exist an unfortunate entrance of the bladder is liable to occur while making the abdominal incision.

The usual method of operation upon this type of pelvic trouble, by slowly doubly ligating, cutting between such ligatures, then dragging the growth *en masse* to this or that side, constantly seeking and attempting to recognize the displaced ureters or bowel, results in an exceedingly slow operative procedure. Slow technic increases the amount of anesthetic used and overdraws on the patient's already lowered vitality.

To the experienced operator, upon opening an abdomen containing multiple tumors, investigation

the individual growths proper have been eliminated, without injury to the misplaced structures vital to the patient, such as the ureters, small and large bowel.

Three patients with multiple fibroids recently have presented themselves to the writer for surgical relief. All of them were bed fast, running toxic temperatures. Each had a very low vitality reserve and, upon thorough study, appeared exceedingly poor surgical risks. To relieve, yet not to lose the patient while upon the table, the following surgical plan, subsequent to the deductions previously made, was adopted.

A long abdominal incision was decided upon with a high primary opening of the peritoneum for investigation as to the existence of anterior wall adhesions. It was further decided to utilize the obliterated blood supply space, or the greatest pro-

tusion point area of capsular covering for the tumors, for the entrance to the tumor proper and their enucleation, without dealing at the same time with the sagging peritoneal covering. The next step of the procedure was to be the removal of this covering structure and the uterus by the usual hysterectomy technic of clamp, excision, then ligation.

The cases were each given careful pre-operative preparation. In each instance the planned long incision of the abdominal wall, with high primary peritoneal opening, was carried out, and in each adhesions were found between tumor, bladder and abdominal wall. The most superficially located tumors were first selected, their obliterated blood supply area was searched for, found, then incised and the tumors individually enucleated by means

operative risk of this technic, when compared with the usual surgical procedure in such type of tumor operations, indicates its adoption whenever it can be utilized. There are some multiple pelvic tumors, of course, for which it will not be needed—those types which have not a marked retroperitoneal extension covering.

The accompanying groups of photographs show the tumors removed from two of my patients and one of a colleague's. The latter presents the multiple fibroid mass, plus a protruding fetus of about four months. In the colleague's patient the bladder was entered in opening the abdomen, due to pressure adhesions between the bladder and tumor and the anterior abdominal wall. My colleague had used the usual procedure pursued in removing tumors and uterus *en masse*, with the consequent long prolonged operative result and unfortunate entrance into the bladder.

The briefer time, the lesser quantity of anesthetic required and the consequent diminished shock, as well as overcoming a probable inoperable condition, are the chief reasons for the adoption of this technic in meeting the problem of the multiple fibroid tumor.

FEWER PHYSICAL DEFECTS, GREATER PHYSICAL POWER.

Courage, fortitude, loyalty and self-denial strengthen and ennoble. They are the virtues of calm weather, more eminently of days of storm and stress. War permits no flights from responsibility. Every obligation becomes more binding, both in relation to the personal life and the good of the whole—the community or state. It may seem a paradox that in time of war when life appears to be held most cheap, life and health come to be thought of as most valuable. The reason is plain. Physical vigor, physical endurance, physical power begin to have an increasing value in the minds of men. Man—the physical man—counts and men begin to make the most of men. The attitude toward man is the same as that toward the newest kind of rifle or the latest type of cannon. What is the best kind and what characteristics are most useful. Even with our brief experience, we have awakened to the nation's need for men with fewer physical defects and greater physical power. The nation is beginning to see that if there had been more interest in public health in time of peace there would be now less need for long months of training for endurance of necessary hardships incident to camp life.—*Quarterly Bulletin, Louisiana State Board of Health.*



FIG. 3.

From one patient twenty-two fibroids, varying in size from a small orange to that of a full term fetal head, were first individually removed, then the remaining uterine structure with its attached flabby erstwhile tumor coverings could be easily dragged into the abdominal wound. Clamps were then applied to the then readily identified and segregated broad ligament and uterine neck. The usual technic of abdominal hysterectomy was easily carried out. As a result of the procedure adopted, the bladder was uninjured, the ureters were readily identified and at no time were in danger of ligation, the retroperitoneal adherent bowel, large and small, were observed, not denuded or disturbed.

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MINOR INJURIES: PHYSICAL CONDITIONS WHICH INFLUENCE HEALING.*

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In my personal work the great predominance of minor injuries and their results, and the fact that I have never heard a paper or discussion on the best method of handling them, or the physical condition of the individual which has a bearing on the healing of such injuries, suggested the following commentaries.

The fact that the more serious affections are nearly always the subject of surgical papers, has caused me to wonder whether any of us really devote sufficient thought and attention to minor injuries, and particularly the physical conditions bearing on them, to prevent the development of serious complications and sequelæ. For instance, when an individual appears with a small cut, scratch or bruise on the hand or elsewhere, have we not been rather too prone to say: "Why, this is nothing but a mere scratch, just apply a bandage and it will be all right shortly,"—and then pay no further attention to the matter until several days later when the patient probably returns with a decided infection implicating tissues which under proper treatment would not have become involved? This attitude on the part of the medical profession has so long prevailed that the laity has naturally come to believe it is not worth while to consult the doctor unless infection has already supervened; and some of the patients I have seen were in serious condition when first observed. We should endeavor to educate the laity concerning the fallacy of this idea. In no other way can we hope to prevent infection and serious after-effects of minor injuries.

Having done considerable accident insurance and employers' liability work, I have been forcibly impressed with the economic loss, both to the employer and employe, from one simple factor, viz., neglect. This applies not only to the laboring classes, although most common with them, but to others whose knowledge should suggest that even minor injuries should not be neglected.

The abnormal fear of the medical profession, and especially of surgeons, inherent in the minds of the ignorant,—and fostered I am sorry to say by some of the better educated but prejudiced classes,—is an important factor in the matter of neglect. The practice of self-treatment by the igno-

rant or the friendly assistance of someone not qualified to treat the injury, and particularly the extraction of foreign bodies from the cornea or the conjunctival sac, is especially pernicious and dangerous; likewise the home treatment of cuts, abrasions, burns, etc., is fraught with dire possibilities for evil. In talking with a prominent ophthalmologist quite recently, he deprecated "Tom, Dick and Harry" trying to remove foreign bodies from the eye, because of the disastrous results he had seen from such attempts; yet we know this is a very common practice. Everyone seems imbued with the idea that it is easy to extract something from the eye of another without the infliction of injury to the ocular apparatus while so doing.

A most serious factor is the insanitary surroundings at places of labor and also in the average home. Much of the danger here consists in secondary infection, the surroundings in which the patient works or lives being such that the keeping of the wound aseptic is an utter impossibility. It must be remembered that dust-carrying bacteria may easily sift through ordinary dressings, and that the same is true of liquids, such as tannery solutions, oils, etc., where the parts necessarily become saturated with such preparations; even perspiration may "wash" infectious material into the wound where the surrounding parts are dirty.

From my personal experience, the next most common contributing factor to unfavorable results in the treatment of minor injuries is the general condition of the patient, i. e., whether he is healthy, naturally a so-called weakling, or suffering from devitalizing constitutional disease. The healing of any major or minor injury may be retarded by the presence of disease. I have often seen marked delay in the repair of minor wounds and injuries from this cause, and the general condition of the patient had to be improved by appropriate treatment before the local injury exhibited any inclination to heal. The majority of such patients either do not realize that they are diseased, or knowingly try to mislead the physician, hoping thereby to keep him in ignorance of their affliction. I have found this factor so prevalent that where a wound does not heal properly or promptly, I know have a urinalysis made, blood pressure taken, blood count made, the sputum examined, and other necessary investigations instituted, and by these means the answer to the question is always obtained.

Syphilis is the most frequent devitalizing disease noted, but readily responds to anti-syphilitic treatment, and healing of the local lesion then rapidly

*Read before the Louisville Society of Physicians and Surgeons, September 19, 1918.

occurs. This has appeared especially true in the poorest laboring classes. Nephritis and diabetes have been frequently encountered and treatment has been annoying and difficult. Alcoholism is found quite commonly, particularly in those of low intelligence, and this may tend to delay healing. Tuberculosis, like nephritis, diabetes and other wasting diseases, retards the healing process. Varicose veins constitute a serious complication when present, which is not infrequently true in burns about the legs and feet.

As an illustration of the necessity of thoroughly examining every patient having a local injury I will briefly cite two cases:

CASE 1: A negro, male, aged eighteen years, a "strapping big fellow," had the skin and subcutaneous tissues literally ground from the top and outside of his right foot, but fortunately the tendons were not involved. The denuded surface was irregular in shape and about 3 by 5 inches in area. He was sent to the hospital where the wound was cleansed and properly trimmed. Healing seemed to progress normally for about a month, that is the surface granulated and the cicatrix appeared healthy.

When the wound had diminished to 1 by $\frac{1}{4}$ inches in area, it began to disintegrate and soon extended until it became 1 by 2 inches in size. The treatment was then changed from the application of balsam of Peru to calomel dressings,—after interrogating the patient as to syphilitic infection or the presence of sores on his body, which was vigorously denied.

When only a linear unhealed and unhealthy looking granulation remained the wound again disintegrated, and again the treatment was changed without appreciable good effect. The patient repeatedly denied the possibility of syphilis when questioned.

After having faithfully employed about everything usually recommended for local treatment in cases of this kind, I lost patience with the man and sent him to the laboratory for a Wassermann test to be made, which showed four-plus positive. He was then referred to the government clinic at the Louisville Public Hospital where healing of the local lesion promptly occurred under anti-syphilitic treatment.

It is my opinion that this patient was entirely innocent or ignorant of his luetic infection. I afterward treated his father for a small cut on his hand which required an unusually long time to heal. The father was not tested by the Wasserman method, as the company employing him refused to pay the

expense and I could not get him to attend the government clinic. I believe the negro boy had inherited syphilis, as I could find no evidence of a scar on his body.

CASE 2: A male, aged fifty-nine, seemingly in good physical health, had a burn about the size of a silver dollar on the outside of his leg just above the ankle extending not quite through the skin. Healing progressed very slowly, and after a few days treatment the results not being satisfactory, urinalysis was made which showed that he was suffering from a kidney lesion. The patient was then referred to his family physician for treatment of the renal disease, but the burn healed slowly despite constant attention and all the assistance he could give. This patient was an intelligent man and anxious to get well.

These two cases are mentioned merely to illustrate that the local injury is not the only factor to be considered. The list of cases might be extended to include many other constitutional diseases, and pursuance of the subject naturally leads to the treatment not only of the primary injury but of the conditions bearing thereon.

It is not always possible to send the patient to the hospital; in fact, this can rarely be done because of the factor of expense. We must therefore look after the surroundings of injured patients and where necessary improve them by education. This may necessitate the employment of considerable tact on the part of the medical attendant, and it most frequently does. It is difficult to make some people understand that they do not have to eat the proverbial "peck of dirt," or be annoyed and exposed to disease-carrying flies, mosquitoes, cooties, etc., but the time has arrived when we must promulgate this line of education.

The necessity for conservation of labor in every line of endeavor demands that an injured person be absent from his work the shortest possible time, and it is only by looking after all the conditions surrounding the patient that we can preserve or increase the efficiency of the individual. Personal, factory and business-house sanitation, and facilities for immediate and properly administered treatment are all necessary, as well as the knowledge available as to the physical condition of the injured.

That this is a good business proposition the larger and most intelligently managed commercial concerns have appreciated, as witness the vast increase in the scope of industrial welfare work within the last two or three years.

HERNIA OF THE URINARY BLADDER.

S. G. GAY, M.D.

SELMA, ALA.

Owing to its proximity to the inguinal region, the urinary bladder, in part or whole, may present itself through any of the openings where hernias make their appearance; but bladder hernias more frequently are found as the direct inguinal variety. By the term hernia we imply the presence of an opening plus a sac with its contents and coverings. In many hernias of urinary bladder the sac is either incomplete or totally absent. Hernias belonging in the gynecological class as vaginal, etc., I shall not consider.

The bladder is a musculo-membranous, hollow viscus, whose principal function is the temporary storage of urine. Excepting the stomach, it is the largest hollow viscus in the human body, and both these organs are subject to marked variations of internal pressure. The bladder is contractable, also expansible and distensible beyond its normal capacity of about 500 C. C. It is suspended superiorly and inferiorly, being fairly, firmly fixed at its base. Its true and false ligaments are composed of fascia and peritoneum. The bladder is generally movable making it capable of being carried in part or wholly into any of the hernial openings.

Modern medical and surgical text books contain meager information concerning extrusion of portions of the urinary bladder as a possible complication in any types of hernias, despite the fact that the pathology was recognized and described early in the eleventh century. The comparative infrequency of the complication is certainly insufficient excuse for its apparent neglect by modern investigators. So far as can be ascertained less than 400 examples of hernias of the bladder have been recorded in the literature of the world. No doubt many more cases will be recorded in the future as the condition becomes better recognized. We can more readily recognize it largely because the fact that the Bassini technic permits more thorough exposure and higher ligation of the sac than in other methods.

Most observers find a greater frequency of vesical hernias among males than among females in which finding I concur. Vesical hernias are more frequently found in the inguinal type of males and the femoral type of females. They are more frequently observed in adults for both sexes

but there are exceptions to this rule, as they have been occasionally found in children of both sexes.

Anatomically there are recognized three types of vesical hernias: (A) The extraperitoneal, a portion of the viscus protrudes along side of the sac of an ordinary hernia; (B) The intraperitoneal, a portion of the viscus appears in the sac covered with peritoneum; (C) The para-peritoneal, a portion of the viscus is covered with peritoneum of the sac. In practically all instances in addition to a portion of the vesical walls the hernial sac contains omentum and intestines. True primary vesical hernias may be regarded as pathological curiosities.

The etiology of these hernias is largely the same as hernias in general. As the cause of this pathological lesion the following factors are of importance; namely, all conditions that tend to increase abdominal pressure, such as occupations that necessitate vigorous muscular efforts; physiological or pathological states which distend the abdominal cavity, stretching the abdominal parietes and widening the orifices normally present in its walls; diseases associated with frequent, repeated, increased, intra-abdominal pressure; conditions which weaken the abdominal walls, such as acute or chronic diseases, especially those causing great emaciation. Obesity or traumatism, such as abdominal operations followed by pathological adhesion of viscera or omentum to the anterior parietal peritoneal wall near a hernia opening may act as pre-disposing causes. Feeble development or atrophy of the aponeurosis of the transversalis muscle and of the conjoined tendon is a factor of great importance in direct inguinal hernia. Congenital, inherited, or acquired weaknesses of the abdominal walls reveal pre-existing hernial sacs of prenatal or post-natal formation. Any condition associated with prolonged over distention, over stretching, impaired contractibility, restricted mobility, etc., of the urinary bladder with congenital malformations of its walls or diseases of the lower urinary organs impairing the expulsive force of the bladder or hindering the outflow of urine may be considered as causes for this type of hernia.

As definite characteristic symptoms seldom occur, accurate anti-operative diagnosis of the vesical complication of hernia is usually impractical. It is suggested that the most constant indicative clinical sign is a hernial tumor which subsides after micturition. Pressure upon the swelling induces a desire to urinate or even cause

the expulsion of urine. According to the majority of observers there are no characteristic symptoms nor does the presence of the complication necessarily produce serious discomfort to the patient. In two cases that came under my observation, there was considerable pain with more or less regularity which formed the main symptom that caused the patients to seek relief. The hernial swelling may be cylindrical, ovoid, soft, elastic and fluctuating or hard and non-elastic. The size of the hernia, particularly when the urinary bladder is not complicated with other viscera may change rapidly, being influenced by the clinical type of hernia, the position of the body, the amount of urine present in the bladder together with the amount of bladder engaged in the extrusion.

The subjective and urinary disturbances are frequent and painful urination, pain at the end of difficult urination. Patients may have to resort to unusual positions or may compress the hernial protrusion in order to empty their bladder. The objective disturbances are increased swelling with accumulation of urine and a decrease with voiding. The injection of fluid or air into the bladder causes an increase of the size of the hernial swelling. A sound introduced into the bladder, may enter the herniated bladder process. A cystoscopic examination of the bladder may show the round contour of the bladder with the opening of the herniated bladder process.

Vesical hernias may exist alone, or with another organ or organs from the same side or from the opposite side of the body. This, however, is unusual, but did occur once in my experience. In only one instance under my observation, was the hernial sac, with its visceral contents large, the smaller ones appeared more painful. Frequently one notes the excessive breadth of the hernial canal and the large hernial ring. The spermatic cord may be to the outer side of the hernial swelling, or spread out over, behind, below or external to it, although it may be found upon the anterior and outer surface of the bladder. The sac may be thin or thick, congested and infiltrated, closely adherent to the spermatic cord, and not uncommonly covered with a thick mass of fatty tissue. This I have observed once. An extra peritoneal bladder hernia has no serous covering, but a pseudo-sac, consisting of connective tissue overlies the herniated bladder process. The pre-vesical accumulation of fatty tissues is thought by many to be

an important contributory etiological factor. The sac contents may be hernical fluid, a part of the uterus, ovary, omentum, small or large intestines, the caecum, or the appendix. The caecum and appendix I found in the hernical contents, together with a portion of the bladder, on the left side, in one instance.

The existence of hernia of the urinary bladder may be unrecognized, suspected, or diagnosed, before operation, or the diagnosis may be made at the operation, or indeed it may remain undiscovered until the autopsy. It is sometimes difficult during the operation to distinguish the true hernial sac from the tumor mass. This may be determined by passing a steel sound via urethra to the field of operation, thus bringing the trabeculated appearance of the bladder muscles in more prominent view. One may expect to find the bladder located nearer the median line than the true hernical sac.

An operator should always be on his guard when operating upon hernias lest he incise the bladder under belief that he is opening a hernial sac. In operating upon a recurring hernia, owing to the possible adhesions that may have been formed, he should always be on his guard and expect bladder complications. If isolation of the hernial sac, from the inner lower portion of the ring be difficult, the involvement of the bladder is to be suspected. One can avoid this injury by securing a good exposure of the operative field. The more exact the dissection of the sac, quite up to the artery, the more likely will cystocele, especially in its earlier stages, be discovered. Vesical hernias can be produced by traction upon the sac. Efforts to place the ligature higher up, may, if one be careless, result in catching up the bladder wall. Should the bladder be incised or otherwise injured during the operation, and the operator is not sure of the accident, a sound may be passed and brought out at the injured point. If this accident occurs, careful suture with non-absorbable material is necessary using care not to penetrate through the bladder walls, after which free drainage should always be provided. In these injuries, immediate closure of the bladder wound is of primary importance; even though its walls are not injured, it is safe to fortify the weakened spot by a few sutures.

Operators are not agreed as to the advisability of using a permanent catheter after bladder su-

ture, nor, if the catheter is used, how long it should be retained in the bladder. It is left in from one day to as long as two weeks. These points appear to be the extreme. Judgment should be used, based upon the extent of the injury, and I believe a medium between these two extremes would be wiser and more practical. Drainage extending to the bladder wound is a prudent provision against leakage from the sutured walls and should never be omitted.

Operations for the radical cure of vesical hernia have practically no mortality. What mortality occurs is usually due to complicating conditions, such as old age, great debility, shock, long standing strangulation, and unrecognized bladder injuries. When complicated in convalescence by urinary fistulae, they usually close spontaneously.

In conclusion I wish to speak briefly of three cases of bladder hernia that have come under my observation. The first is that of a negro male child five years of age, referred to me fifteen years ago by Dr. Sellers, then of Brown, Alabama, for a strangulated, indirect, left inguinal hernia. This proved to be most unusual and interesting, as the operation proved the existence of a transposition of the caecum and appendix from the right to the left side, both of which were found in the hernial sac together with a small pouch of the urinary bladder. The caput of the caecum was found gangrenous for an area about the size of a fifty cent piece. This was resected, and the appendix was removed. All the hernial contents were returned to the abdominal cavity and the wound closed, the patient had rather a stormy time but made a good recovery.

(Case 2) A. W. C., white, male, age 74, druggist by profession, had led a very active business life. He had a small, left, indirect inguinal hernia for some years. At the age of 71 had a severe attack of cerebral hemorrhage, paralyzing his right side. About a year after this he decided to have his hernia operated. This was successfully done under local anesthesia (cocaine). A year later a direct inguinal hernia appeared on the right and paralyzed side. This was a small hernia, but was quite painful to him. He decided upon a second operation. On account of his then physical condition, members of his family and myself endeavored to dissuade him. He replied that he had rather be dead than live with the discomfort that he was then enduring.

The operation was done under local anesthesia (cocaine). An unusual amount of fat was noted, which aroused suspicion and was carefully divided upon the supposed sac, when a trabeculated surface was observed, this being pushed inward and the peritonum opened farther out, a hernia of the bladder was demonstrated. The usual closure was done. Patient died three weeks later from a chronic interstitial nephritis which was known to exist prior to the operation.

(Case 3) J. E. G. male, white, age 18 years. This patient had a left undescended testicle. No indication of a hernia, nor discomfort of any sort until sometime after he had joined a cavalry company in the summer of 1916 when the Mexican Border Army was being formed. Shortly after entering this service, he commenced to notice discomfort in the left inguinal region after drilling on horse back. In October 1916 he was visiting his home on a furlough. He consulted me, when a small direct left inguinal hernia was noted. Operation was advised, not accepted until November 15, 1916, the painful condition having grown steadily worse. At the operation when I thought I was opening a slightly thickened hernial sac, an excessive amount of clear fluid with a slight uriferous odor escaped. There being some doubt as to whether a thin walled bladder had been opened or not, a catheter via urethra was passed, and brought out at the opening, definitely proving that the bladder had been opened. This incision closed with silk ligatures. The peritoneum was opened on the outside of the bladder and a search for the testicle was made, which was not found in the inguinal canal or in the abdominal cavity, this organ had either atrophied or had never developed. The peritoneum, muscles and fascia were closed, with a single drain extending well down to the bladder wound. Then followed some urinary leakage. This stopped spontaneously within a reasonable time. He joined his Command on the Texas border, and was honorably discharged from the Army. He followed the occupation of gas helper until the summer of 1917, when he again entered the Army, where he is now serving. There has not been a return of the hernial condition.

In case two and three here reported, no other viscus was found in the hernial protrusion at the time of the operation, except the urinary bladder. This fact may or may not account for the excessive pain complained of.

THE CONSERVATIVE TREATMENT OF
OCULAR INJURIES.*

J. H. HESTER, M.D.

LOUISVILLE, KENTUCKY

The following three histories are presented briefly for the purpose of illustrating the favorable cosmetic and functional results which may sometimes be obtained by rational conservative methods of treatment of ocular injuries. In the management of such cases the decision for or against the advisability of immediate enucleation will depend to some extent upon the character of the missile by which the injury was inflicted. However, regardless of the nature of the offending instrument, where infection ensues, enucleation is usually imperatively demanded to preserve the integrity and function of the uninjured eye.

Wounds about the eye inflicted by bullets from small caliber firearms seem especially amenable to conservative treatment; at least such has been my experience. On the other hand, however, those due to particles of iron or steel almost invariably require treatment by more or less radical methods, otherwise the opposite eye becomes involved and the vision of both may be ultimately destroyed. Infection and sympathetic ophthalmitis constitute the greatest impending dangers in all ocular injuries, and have always been the *bête noire* of the ophthalmic surgeon.

History 1. J. S., a male, aged twelve years, was shot with a 32 caliber rifle, June 13th, 1915, the bullet entering just below the right eye. He was sent to the Louisville Public Hospital, where I saw him about two hours after the injury. Examination showed that the bullet had ranged backward and upward, lodging in the posterior portion of the orbital cavity. No effort was made to remove the missile, nor was a probe introduced into the wound of entrance.

The patient was seen and examined during the next few days by several other ophthalmologists, and as the conditions seemed rather serious the majority of them recommended immediate enucleation of the injured eye. However, after due consideration I concluded to watch the patient carefully, to test his vision daily, and simply await further developments. In the event any definite indications developed for enucleation I was prepared to operate immediately. The boy had absolutely no vision in his

right eye when admitted to the hospital. The external wound was kept open to insure free drainage, and no infection occurred. The wound healed from within outward during the succeeding two weeks.

The eyes were then fitted with glasses and the following vision obtained: R. E. 8/10, which is nearly normal: L. E. 10/10, which is absolutely normal. The patient now states that he can see equally well with both eyes; of course he still wears glasses and will probably have to continue doing so indefinitely.

In the majority of instances of this kind the eye is immediately enucleated, but by constantly watching the fundus for retinal changes indicating beginning sympathetic ophthalmitis the operation may be safely postponed. If such symptoms appear at any time, the injured eye may then be enucleated. So long as no symptoms develop I think it is better to retain the eye even though it may be without vision, than to enucleate and thus force upon the patient the necessity of wearing an artificial eye.

History 2. Mr. S., aged forty-five, was shot December 2nd, 1916, with an old-fashioned muzzle-loading 44 caliber pistol. The bullet entered just above the left eye, and ranging downward lodged behind the eyeball. Total blindness in that eye was immediately produced, vision being NIL when I first saw the patient a few hours after the accident. The missile followed the direction of the optic nerve, and evidently the nerve was damaged to a greater or less extent. There were indications of injury of the retina and choroid where the bullet struck the upper and posterior portion of the eyeball.

It was difficult to decide in this case whether or not immediate enucleation should be practiced, but I finally decided to observe the patient daily and await developments. The eye was closely watched and today it is practically normal in appearance. The man could not open the injured eye for about a month, and slight infection occurred from a wad which followed the bullet into the tissues and which had to be removed. I also extracted a small section of the bullet, which was divided into three pieces, but the major portion still remains in the tissues.

After opening and draining the track of the bullet, the eye was examined daily with the ophthalmoscope for retinal or fundal changes, and none being noted the eye was preserved. Had any symptoms of irritation developed the injured eye would have been enucleated immedi-

ately. I regret to say this patient has very little vision in the injured eye, but am glad that it could be saved for cosmetic reasons. He has had no further trouble and says he now has slight vision in the left eye.

The lower portions of the retina and choroid escaped injury, but the upper and posterior parts were more or less damaged by the bullet. The patient had no perception of light at first, but after the wad and portion of the bullet had been extracted he could distinguish light from darkness and vision has slightly improved since. The x-ray plate shows the two larger pieces of the bullet still in the tissues.

The majority of operators probably would have attempted to remove the bullet immediately after the injury; but I believe it advisable to leave such foreign bodies alone so long as they produce no trouble. I have under observation several patients who have carried bullets in about the same situation as this for twenty years without the production of irritation or other symptoms. This is certainly better than to attempt removal of the bullet and thus subject the patient to the additional danger of infection. It is almost impossible to overcome infection in this situation without enucleation of the eye.

History 3. Mr. R. T., aged seventeen. This is not a gunshot wound, but the injury is similar to the others. Several specialists have seen this patient in consultation with me, and there is some question as to the exact cause for the persistent left-sided blindness which he exhibits.

The patient states that he was injured while exercising in a gymnasium, that he missed the "punching bag" and fell upon a sharp screw about three inches long and one-quarter inch in diameter which entered just below the left eye ball and ranged upward and backward. A probe could be introduced into the wound for at least one and one-half inches.

I saw the patient about an hour after the accident. Immediate ophthalmoscopic examination showed the left eye totally blind at that time. The pupil was widely dilated and unresponsive to light. The patient was treated along conservative lines and the eye was closely watched. The main question was whether to take the risk of leaving the eye, or whether to resort to immediate enucleation; but so long as there were no indications of irritation in the opposite eye, I concluded to postpone operation. The external wound was kept open for drainage and thus allowed to heal from behind forward.

The progress of the case was satisfactory, excepting for the complete ptosis of the upper lid for about three months. Under treatment with the high frequency electric current, massage etc., the muscle has been practically restored to its normal condition. The optic nerve was probably completely severed, although there developed no evidence of optic neuritis. The fundus of the eye at first appeared normal, but it was later noticed that the optic disc was getting pale. The real cause of his blindness, however, remains uncertain. While the boy has no vision in that eye, I succeeded in saving it, which is certainly preferable to an artificial eye. No roentgenoscopic examination was made, nor was there any necessity for it, as the instrument with which the injury was inflicted was immediately withdrawn.

The first and most important feature in the conservative treatment of injuries about the eye is the institution of adequate drainage; second, frequent ophthalmoscopic examination of the fundus of the other eye. Sympathetic ophthalmitis is always to be feared in cases of this kind, and the moment indicative symptoms appear the injured eye should be removed, otherwise the logical ultimate outcome will be blindness in both eyes. Experience has shown that in the majority of instances, if the injured eye be enucleated immediately upon the appearance of indicative evidence of irritation in the opposite eye, the latter may be preserved.

While serving as interne in one of the Chicago Hospitals we treated a large number of patients whose eyes had been injured by particles of steel, and in the majority of cases enucleation became imperative to preserve vision in the uninjured eye. Enucleation is especially indicated if the steel enters near the ciliary body, the chances being much greater for the superposition of sympathetic ophthalmitis if the eyeball is damaged near the ciliary region or the sclero-corneal junction. I believe in seventy-five per cent of patients under such circumstances enucleation will be necessary sooner or later if the steel remains in the eye.

The first sign of sympathetic ophthalmitis shown by the ophthalmoscope is a slight retinitis; the retina becomes congested, minute white specks are noted around it and also in the vitreous fluid, the patient complains of spots before the eye. The vision should be tested daily and so soon as any blurring or reduction is noticed, one should look for other evidences of sympathetic ophthalmitis. So long as indicative symptoms do

not appear, I think it is far better to do nothing excepting to institute adequate drainage, and combat infection should it supervene by facilitating free outflow from the wound and the use of suitable antiseptic irrigations.

A good working rule in ocular injuries may be stated as: when there are no signs of irritation present in the good eye, treat the injured eye conservatively or let it alone; from a cosmetic standpoint the natural eye, although it may be blind, presents a far more attractive appearance than an artificial eye. The moment indicative evidences of irritation or sympathetic ophthalmitis appear, enucleation of the injured eye becomes imperative to preserve the vision in the uninjured eye.

THE VALUE OF THE DICHLORAMIN-T SOLUTION (DAKIN-DUNHAM) IN THE TREATMENT OF INFECTIONS OF THE UPPER AIR PASSAGES.*

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Dichloramin-T, the basis of the Dakin-Carrel fluid so extensively used as an antiseptic in a wide variety of infectious conditions, has an intense germicidal action corresponding to its high content of chlorin. It is difficult to find for it perfectly satisfactory solvents which will yield stable solutions. Drs. Dakin and Dunham state that the best medium thus far found in an oil obtained by the chlorination of paraffin wax, to which has been given the name "chlorcosane." Other solvents experimented with are a mixture of eucalyptol and paraffin oil, and a heavy oil obtained by the chlorination of eucalyptol. Eucalyptol has been found to be irritating. Chlorosane is not irritating and has seemed decidedly preferable. Explaining the action of dichloramin-T in oil, Dr. Dakin says that antiseptics incorporated with or dissolved in oily substances usually possess little if any antiseptic activity because intimate contact with the infected matter is hindered by the oil. When, however, the dichloramin-T solution in chlorosane are brought in contact with aqueous media the partition coefficient between the oil and the water is such that a certain amount of the dichloramin-T passes into the water and there exerts its germicidal action. The amount of the dichloramin-T thus passing from the oil is increased by the presence in the aqueous medium

by substances capable of taking up chlorin. So that the oil solution seems as a store for the antiseptic which is drawn upon to maintain the germicidal activity of the aqueous medium with which it is in contact. The dichloramin-T oil solution may be sprayed upon wound surfaces or poured into accessible parts of deep wounds. It yields moderate amounts of the antiseptic to watery media, such as secretions from wounds or mucous membranes. It is suitable for sores requiring prolonged antiseptic treatment and for first dressings of wounds which do not require irrigation. The application of the oil is extremely simple, and generally it need not be renewed more than once in twenty-four hours.

Admitting the germicidal power of dichloramin-T, it is desirable to study its value in the disinfection of septic conditions of the upper air passages, regions especially liable to infection, prone to harbor germs of dangerous character, abounding in recesses difficult of access by the ordinary means of application, and often becoming foci of infection threatening extreme danger. This is especially true of the upper nasal region, the vault of the pharynx and the tonsils. The dichloramin-T may be used to advantage in these regions under three different conditions:

1. To prevent the extension of newly acquired infection.
2. To overcome the acute results of infections, and
3. To abolish the bacilli persisting in carriers.

The success of the method must depend upon the thoroughness of the application of the disinfectant. Brushing the surface of the tonsil or spraying the lower section of the nasal cavity cannot possibly be effective. A spray atomizer must be used which will carry the spray in all directions, upward, downward and sidewise.

The crypts of the tonsil must be disinfected to their lowest depths, and the superior half of the nasal cavities must be thoroughly reached. To effect this the following principle must be recognized and carried out: The parts must first be cleansed, and then exposed to the fullest extent by the application of adrenalin or some similar astringent, and finally the dichloramin-T oil sprayed into them until every crypt and recess has been completely reached. This thoroughness is absolutely necessary in order to secure the removal of the most deeply seated germs.

Used in the strength of two per cent. or less, the solution with chlorcosane is not irritating, although stronger solutions may be. Suitable atomizers are

* Abstract of paper read before the American Laryngological Association, May 27, 1918.

necessary. The success of this method has thus far been gratifying.

Where this method fails, in the presence of hypertrophied tonsils or adenoids, the removal of the latter may be necessary to affect a final cure.

The desire of the author is to furnish a method so simple in itself as to be readily carried out by the average practitioner, with the aid of apparatus inexpensive, durable, clean, compact of form, light of weight and therefore available for use under all circumstances of medical practice, whether civil or military.

The essentials to success are:

1. Recognition of the principle of the necessity for the complete exposure of the centers of infection.
2. The use of a proper spray atomizer.
3. The devotion of sufficient time and care to the effective carrying out of the treatment.

A TYPICAL ECTOPIC GESTATION: CHYLOUS ASCITES: FECAL OBSTRUCTION FROM LARGE CHOLELITH.

LEO BLOCH, M.D.,
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CASE 1—G. A., a female, aged thirty-two, with negative family history. The patient has been married twelve years and has borne three children. The first child was delivered with forceps, and died at the time of birth. The two succeeding labors were normal, and the children are living and in good health.

In March the patient had a miscarriage, and the doctor who attended her said she was about three months advanced in utero-gestation. A peculiar feature about this pregnancy was that the woman menstruated at the regular time every month, the character and quantity of which she considered perfectly normal. Her menses began at the age of eleven, are of the twenty-eight day type, average duration seven days.

During the first week in the following September she noticed a tender area in the cholecystic region which she attributed to her having "caught cold." That night about ten o'clock she was awakened by severe abdominal pain located especially about the umbilicus. She described the pain as cramp-like in character and said it made her "double-up." She vomited twice during this attack which was followed each time by some relief from the pain. The next day she noticed considerable soreness throughout the entire abdomen. During the suc-

ceeding four weeks she suffered six similar attacks of pain. After each paroxysm she said she felt perfectly well and was able to perform her usual work. Careful inquiry developed no history of chills, sweats, nor air hunger at any time.

Physical examination: Patient shows evidence of anemia, and slight jaundice is present; abdomen swollen in lower right quadrant; considerable tenderness over cholecyst and right iliac region. Vaginal examination revealed mass in right tubal region not sensitive to the touch; uterus slightly elongated but movable. The urine was examined with negative findings. Pulse normal, temperature slightly elevated. Blood examination: R. B. C. 3,400,000; W. B. C. 16,500.

Celiotomy: right rectus incision. Upon opening the peritoneum blood literally poured out. The abdominal cavity was evidently filled with blood. The right Fallopian tube was the size of an orange and had ruptured. A small fetus was found free in the abdominal cavity attached to the tumor-mass by the umbilical cord. The right tube was ligated and removed. The free blood was allowed to remain in the cavity and the abdominal incision was closed without drainage. The patient reacted well from the operation and recovered without untoward incident.

So far as my experience extends this case is unique in that there were no clinical symptoms indicative of ectopic gestation. The usual manifestations were absent, i. e., shock and air hunger after rupture, amenorrhea, with the passage of portions of decidual membrane, vaginal and mammary changes, etc. In all the other cases of ectopic gestation which have come under my personal observation, the clinical symptoms have been practically typical and in consequence no particular diagnostic difficulties were encountered. In the case just cited, however, ante-operative differential diagnosis was a matter of physical impossibility, and the patient was subjected to celiotomy under the tentative and rather ambiguous diagnosis of "a surgical lesion in the lower right abdominal quadrant."

It might be remarked in passing that, in so far as the indications for treatment are concerned, diagnostic accuracy or inaccuracy in cases of this character is a matter of little consequence, prompt surgical intervention being imperatively demanded in practically every instance from the standpoint of the patient. Delayed operation in ectopic gestation is fraught with danger under any circumstances, and even in the absence of a typical history and the usual clinical symptoms, the surgeon is justified in

recommending exploratory celiotomy. Only by this method of procedure will the greatest benefit accrue to the largest number.

CASE 2.—J. O., a female, single, aged fifty-three. Present illness began six months ago. Prior to that time she had enjoyed comparatively good health. At the time of my first observation there were evidences of advanced cardio-renal changes. Her urine contained two per cent. of albumin together with numerous hyaline and granular casts. There seemed to be an aortic stenosis, or at least an obstructive lesion at the aortic valve. The patient was sitting in bed having been unable to assume the recumbent posture for some time. She also had a very prominent thyroid gland, and a pronounced general ascites.

I saw this patient on consecutive days for a period of two weeks and administered the usual remedies advocated in such cases, such as jalap, magnesium sulphate, etc., without any appreciable benefit. The accumulation of fluid in the abdominal cavity became so great that paracentesis was finally required which was accomplished in the usual manner and nearly two gallons of fluid withdrawn from the abdominal cavity. To my great surprise the fluid was milky-white in color and evidently consisted of chyle. The patient died at the end of six weeks, paracentesis having been necessary at frequent intervals during the interim. Necropsy revealed a malignant neoplasm of the pancreas; that is, it evidently started in the pancreas and by extension had occluded the thoracic duct.

I might add that the thyroid enlargement rapidly subsided after the first paracentesis. The woman had been quite large all her life; at my first observation there was evidence of fluid in the subcutaneous tissues and she looked as if she then weighed about two hundred pounds. Following the paracenteses emaciation was rapid and at the time of death she weighed only eighty-five pounds.

Cases of chylous ascites must be rather uncommon, and this is the only one which has come under my personal observation. Moreover, so far as I am informed, only one similar case has been seen in Louisville during the last twenty years. The other patient was a male of fifty-five who consulted Dr. William C. Dugan because of tremendous ascites. Paracentesis was immediately practiced and two gallons of milky fluid withdrawn which was pronounced chyle. After the paracentesis a pancreatic tumor could be palpated. The fluid rapidly reaccumulated and during the succeeding two months paracentesis was necessary once per week.

At one time four gallons of perfectly white fluid was removed. The patient was unable to assume the recumbent posture, he slept sitting in an arm chair with the tremendous abdomen hanging between his knees. Emaciation became extreme like a man in the last stages of starvation. Death occurred at the end of two months. Necropsy not permitted.

CASE 3.—B. C., a female, aged sixty years, a widow for twenty years, seen in consultation with the attending physician, Dr. W. H. Coleman, of Louisville. The patient is a pronounced asthmatic and according to the history has had three or four attacks of so-called biliary colic during the last ten or fifteen years. She is also a cardio-vascular subject.

Dr. Coleman was called to see this patient and based upon the symptoms present made the diagnosis of acute fecal obstruction. She had then been vomiting almost constantly for four days and fecaloid material had been regurgitated. During this time she had persistently refused surgical aid and would not consent to go to the hospital, remarking that "she would rather die at home." I saw the patient in consultation and concurred in the diagnosis made by the attending physician. And while she was not a good surgical subject, her condition was extremely serious and we concluded it would be advisable to send her to the hospital and take the chances of immediate operation as a life-saving measure.

Celiotomy: When the abdomen was opened the fecal obstruction was found to be due primarily to the presence of a large cholelith. The intestine had become twisted upon itself and its lumen thus entirely occluded. We untwisted the intestinal kink and pushed the cholelith with the accumulated feces downward into the rectum. The patient later voided the concretion per rectum, and I am glad to say made an uninterrupted recovery.

Cases somewhat similar in character to the foregoing are not uncommon, as investigation of surgical literature will amply testify; but complete fecal obstruction from a large cholelith with an occluding intestinal kink must be exceedingly rare, and for that reason the case appears of unusual interest. The patient was a cardio-vascular subject of sixty and practically in extremis when the aid of surgery was invoked or permitted, yet she successfully withstood the anesthetic and the necessary operative trauma, thus demonstrating that the aged and those with cardiac lesions are not always unfavorable surgical risks. The method of relieving the

obstruction also deserves especial comment. The intestine was not incised, but the kink merely straightened and the foreign body then aided in its progress toward the anal outlet by manual manipulation. The wisdom of this method of management is emphasized by the satisfactory ultimate outcome. The result might have been less favorable had the usual plan been followed, i. e., incising the intestine and removing the foreign body through the abdominal incision.

Letter to the Editor

Lt. Arthur E. Guedel, M. C., U. S. A.,
Base Hosp. 23, A. E. F.

Aug. 20, 1918.

MAJ. J. MACDONALD, JR., M. C., U. S. A.,
New York City.

MY DEAR MAJ. MACDONALD:

I wish that you might see the difference in the attitude of Mr. Every Day Frenchman toward the American uniform since the American fighting man has been busy over here. You see, in the beginning it took some time, a good deal of time perhaps, for the U. S. Army S. O. S. to get ready for the fighting man and during that time of preparation, which Mr. E. D. Frenchman could not altogether understand, he had lately been wondering whether or not the Americans really would ever get into the fighting as the French had expected them to do; and while there was never any lessening of the courteous treatment received by the Americans, there was beginning to appear or rather to be felt, an undercurrent of conjecture regarding what the Americans were going to accomplish in a fighting way.

However, that is now all past. The American has come into his own over here. He has made good with Mr. E. D. Frenchman as he has made good with himself. Nothing is too good for the American here during the past few weeks. He is made to feel at home as he never was before. To be able to observe this change, to be able to see the arrival of that which we were all sure would come, has been well worth a year of work on this side. And of course the good news is now to be all on our side until Germany yells "enough."

I should call this a pretty accommodating army, at least from the standpoint of the medical officer. The men higher up in the medical corps here try to give all of us just what we want in the way of special work, and the degree of success that they have attained in this is remarkable. There are but

few medical officers here who are not doing the sort of work that they have asked for. And if they tire of the work that they asked for at first, their request for a transfer to other duties is usually honored.

There is the Casual medical officer who is sent over here attached to nothing, to be assigned to duty upon his arrival. That fellow has a lot to think about on his trip across. He wonders what he is going to draw and he has mental pictures of everything from the exciting and hard front line regimental duty, to the irksome job of dispensing pills or writing up records back in the rear some place. Although but few on their arrival want any of the front line stuff, it is surprising how many, after they have been here a few months, scramble to get assignments to just those places that they feared, namely, the front line jobs. Our directors seem to have followed the plan of allowing a man to learn from experience here what he wants to do and then putting him at that work wherever it is possible. As I have said, it is usually possible.

Many men who came over here with Base Hospital units have at their own request been placed on "surgical teams." The surgical team job seems to be one of the favorites. These teams consist of an operating surgeon, a surgical assistant, both medical officers, two surgical nurses, two surgical orderlies and an anesthetist, who may be either a medical officer or a nurse. This team is considered an itinerant unit and is sent from place to place wherever they may be needed to extract German souvenirs from the persons of our fighters who have been unable to get between the flying shell fragments and machine gun bullets of the enemy. That means that these teams travel around a lot and are always enjoying the thrill of the real game. Usually their work is in an evacuation hospital (casualty clearing station) during a rush period, with time for rest in the rear, between rushes. There is nothing prosaic about their work and there are remarkably few of them who are themselves placed on the casualty list.

In the quiet sector there is no need to keep a heavy force of medical officers. When the quiet sector becomes an active one, lending support to heavy action in front of it, the official force is augmented by these surgical teams. Officers who serve on itinerant surgical teams seem to be satisfied with their work, to like it, in fact, very much and do not want transfer to other work. I have known promotion to be declined on the part of the officer where such promotion carried with it a transfer from his team to other duties. There are always

many men in the rear who are ready to jump at a place on these teams.

As for the amount of work to be done here, this of course varies. We are always busy, even in the quiet periods, but there are times during the rushes when we are busy as we never thought we could be.

Different hospitals employ different methods of shifting their officers to fill out the twenty-four hour day with work, for in the rushes every hour is a working hour. The eight-hour shift is most commonly employed. Two teams are assigned to one table with eight hours' work and eight hours' rest. Others may employ the twelve-hour shift. And then there are times when a hospital will be caught in such a manner that one team must work straight through for twenty-four hours. This, however, is seldom the case, for other surgical teams are rushed to their assistance *toute de suite*.

How do we live? Usually the best we can, which is not bad at all. At the front the officers live in billets or dugouts, according to their assignment. In a rapid advance they may live in a ruined house or under any shelter that they can find, but our billeting officers here are a busy and efficient lot, and as a rule when an officer arrives any place there is a room awaiting his occupation.

In the rest camp, barracks are often the officers' quarters, but here, too, when there is an adjoining room, comfortable rooms are found for the time being. Those who are located in the bases have permanent and comfortable quarters.

The food over here is, I'll wager, better than you are getting at home. Most of us are in better health than we have ever been before.

As for news of the progress of the fighting, you get it there as well as we do here. But you do not get the tales of battle first hand from the wounded soldiers just off the field as we do. That in itself is worth being here to get. It is one thing to read a man's statements and another to watch his eyes while he is telling his story, which latter is exclusively our privilege. And such stories as they tell! We get them before they are cold to the narrator; when they are fresh and truthful and peppery.

My hat is off high to the American fighting man. There is nothing in the world that can beat him. We are mighty proud to be wearing his uniform. Since the American fighter has jumped into this game as he has, we are all of us carrying our heads pretty high. I wish you could see us swell up.

We are short of medical anesthetists here. That is, we are short of men who have made anesthesia a special study. In consequence of this, those of us

who are here are placed in charge of that work in large hospitals or medical centers. The nurses are taught to do the ordinary work while we carry on a sort of general supervision and do the difficult work ourselves. I might say that I thought I knew a lot about anesthesia before I came over here, but I have learned so many new things here that I now feel I knew but little before. It has been well worth my while from the standpoint of education as well as from the standpoint of patriotism.

Honestly, I feel sorry for the deluded young M.D. back there who has not had the nerve to get into this thing. How sorry he is to be of his timidity at this time, he is not to know until after the war, and his opportunity has vanished. Give him my sincere sympathy. He is reaping his harvest of money now, but after this game is called, he is going to be a bit out of luck.

Some time in the future when I have nothing better to do I shall impose upon you another letter.

Kindest regards,

ARTHUR E. GUEDEL,
1st Lieut. M. C., U. S. Army,
Base Hosp. 23, Amer. E. F.

HOSPITAL REORGANIZATION.

The mobilization of civil hospitals in the interests of national welfare would probably lead to many forms of reorganization for the promotion of efficiency, but the results might work to the disadvantage of organizations that have been perfected through many years of labor and enthusiastic cooperation by physicians and laymen. It is of the utmost importance, therefore, for hospitals themselves to endeavor to weigh their own difficulties and bring about the needed readjustments. In preparing to meet the exigencies which have already arisen through the volunteering of a large proportion of medical men for military and naval service, through the limitation of the term of service of internes and their prompt registration in the Medical Reserve Corps, and through the regulations attendant upon the pursuit of the study of medicine, many serious problems have arisen. Added to these are the difficulties incident to securing an adequate number of nurses in training to supply the demands of the military and civil population. To meet the difficulties through a national program various plans have been suggested and whatever their outcome may be, the fact remains that internal reorganization must be begun at once by the hospitals.—*American Medicine*.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

**SUBSCRIPTION PRICE, TWO DOLLARS.
FOREIGN, TWELVE SHILLINGS.**

Original Articles and Clinical Reports are solicited for publication with the understanding that they are contributed exclusively for this journal.

It is of advantage to submit typewritten manuscript; it avoids errors.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, DECEMBER, 1918.

A NEW SURGICAL MALADY.

The description of a new surgical disease certainly deserves comment no matter how unusual and trivial it may be. While the condition which Halsted (*Johns Hopkins Medical Bulletin*, Sept., 1918) describes under the name "Sinus Spud" is apparently quite harmless the disease nevertheless bears a considerable importance because, if unrecognized, it may be easily confounded with a malignant disease and so lead to a false prognosis. This was actually done by even so keen a clinician as Halsted. Halsted defines sinus spud as a "finger-shaped subcutaneous tumor of the perineum, quite free at its tip and with the hardness and elasticity of cartilage." This definition is not quite accurate because Halsted describes one of his four cases as occurring in the right iliac fossa, but from the description we feel ourselves free to be skeptical concerning the validity of this case. The remaining three cases, however, seem entirely consistent, and their true nature was proven by operation in two instances.

A short description of these three cases will suffice to indicate to the reader the real nature of the condition. The first was observed by Halsted 22 years ago. A physician noted a small, hard, teat-like, non-tender mass in the perineum which was diagnosed as a malignant tumor of the rectum. The tumor crossed the median line, was freely movable

at its anterior, superficial portion and became less movable and more deeply fixed at its other extremity where it seemed lost in the bulbo-membranous urethra. At operation, Halsted found that the mass consisted of fibrous tissue surrounding a narrow sinus blind at both ends; the deep end of the sinus was in contact with the bulbo-membranous urethra but did not communicate with it. In the second case, a hard circumscribed slightly tender and freely movable mass was noted in the perineum. There was another smaller mass near the anal margin and the two were connected by a narrow strip of connective tissue. At operation the same conditions as noted in case I were observed—a sinus closed at both ends. A year later, however, a urethral fistula developed. The third case was not operated, but the physical findings were precisely those previously described; a year later the masses had completely disappeared.

Halsted is at a loss to definitely explain the pathogenesis of "Sinus Spud," but he believes it possible that at some previous time there may have been a urethral or rectal opening which had become closed. In no instance, however, was there a previous history of urethritis, but Halsted regards it as significant that in two of the cases one end of the sinus led to the same spot—the bulbo-membranous urethra. This fact would seem to exclude a rectal origin, although in one case the patient gave a history of having been operated for fistula-in-ano one year previously. Halsted believes the disappearance of the "Spud" in the third case may have been due to sterilization by an active inflammatory process, similar to that which occasionally occurs in sebaceous cysts.

We have deemed it important to call attention to this condition, not only because of the novelty of its interest, but also because some of our readers may have light thrown on their understanding of a condition that they may have met in the past but not recognized. This article of Halsted's, we predict, will probably give birth to many others.—E. M.

SOME HOMILIES CONCERNING ABDOMINAL SURGERY.

While our attention is being called to other things, we should not forget that the reaction of the human abdomen to disease and injury remains unchanged. There are certain verities of which the surgeon should constantly be reminded.

The peritoneum is extremely susceptible to infection; and being infected conveys disorder from one organ to another. No surgeon is competent to

deal with abdominal diseases unless he has an understanding of its pathology. Nor is a surgeon competent to invade the peritoneum until he has added to his knowledge a large experience as assistant and student under a master of the subject. This is because abdominal surgery can be learned only by experience. To open the abdomen for even the most simple disease may reveal complications the handling of which would try the most skillful surgeon. Conditions within the abdomen can never fully be revealed by external examinations. Only when the disease is uncovered to the sight or touch can the surgeon be assured of its character. In most cases of abdominal disease it is better that the disease be left to nature than that the peritoneum be invaded by an inexperienced or unskillful surgeon.

The oft-repeated conventionality that the after-care of surgical cases is as important as the immediate treatment is not well founded. In abdominal operations the fate of the patient is usually decided by what the surgeon does before the abdomen is closed.

Every abdominal disease is serious; and invasion of the peritoneum must always be regarded as a major operation. The idea should not be promulgated that certain operations are trivial affairs; it is unfair to the patient, and it encourages boldness in the inexperienced. Operations should not be undertaken to cure conditions which are amenable to less hazardous measures; and when undertaken they should promise the possibility of relief, and the hazard should not be unduly out of proportion to such possibility.

The surgeon should calculate the patient's reserve strength and operate at the propitious time. The emergencies, such as strangulated internal hernia, acute perforation of the intestine or gangrene of the bowel, offer little margin for such calculations. Nor can any of these be diagnosed positively except when exposed to view. On the other hand, an infected ovarian cystoma or a bleeding uterine fibroid, which are easily recognized, may require immediate operation, tentative operative relief, or treatment preliminary to a deferred operation. The surgeon must also take into account the relation of the patient's abdominal disease and the operation to disorders of the heart, kidneys and other organs. Arbitrary routine is not desirable; each case should be regarded as peculiar and receive the special consideration which its conditions demand.

Let surgeons not be responsible for the vicious teaching that abdominal operations can be done most anywhere by most anybody. Exposure and

insult to the peritoneum should be minimized. Operations should be conducted with speed and precision; and by a surgeon with the golden rule in his heart.

Discourses to bystanders and audiences are best delivered not by the operating surgeon, but by another surgeon assigned to that special task—preferably an assistant of the operator. If the operator carries on the discourse, an assistant should be performing the operation. For the surgeon to converse and explain to bystanders, thereby delaying his work, is a crime not forbidden by statute but by a law of higher ethics. Only the competent should be licensed to perform these serious operations; and neither the interest of the surgeon nor that of the bystander should be paramount to that of the unconscious patient.—J. P. W.

TUBERCULOSIS AND THE WAR.

We do not dwell upon the upheaval the world has suffered through war. It is a commonplace that peace has its battles also; and in this connection it might be well to bring back into fresh memory the conception of a golden era as visioned by Pasteur, who felt that perhaps a day would arrive when the great scourges of diseases would be conquered, each possibly by a specific remedy.

For the problem of tuberculosis, there is no peace as yet, let alone a specific remedy. In civil life it constantly mobilizes its victims and takes its toll.

The great war has put on trial measures for saving life so carefully worked out during years of peace and in a sense, therefore, the war has become an experimental epoch.

To begin with, tuberculosis is almost a universal disease. Infection, as a rule, takes place in childhood. We have then to contend with the selection of military material from young men who nearly all carry with them at least a childhood infection with tuberculosis. It is apparent that the stress and strain of a terrific war, such as this one, would have some effect in the way of increasing or relighting old processes of tuberculosis, and yet Osler, Elliott and Schroeder have pointed out that the incidence of tuberculosis among the young men in our army is not greater than the incidence among our young men in civilian life at the same age period. On the contrary, there seems to be an increase in tuberculosis morbidity in some civilian populations since the outbreak of the war. (Thompson-News-holme.)

The effect of poisonous gases plays no very large rôle in the etiology of tuberculosis, nor has trauma been a factor with special reference to the bones and

joints. On the other hand, physiological over-strain and undue exposure have undoubtedly been definite causes of tuberculosis and in a measure the many respiratory infections so prevalent in concentration areas were responsible for the fresh start of tuberculous disease.

For the surgeon a matter of no negligible importance has been the fact that during the extensive physical examinations of recruits many men were rejected as having pulmonary tuberculosis when the symptoms for this diagnosis were produced by pathological conditions of the nose, throat and sinuses (Rist). Also Elliott found that among the tuberculosis suspects there were many with collapsed lung, and gunshot wounds of the chest, followed by chest complications with consequent collapse of lung; and that there were also patients with bronchiectasis and lung abscesses.

The important point to bear in mind is that there is scarcely a sign or symptom of pulmonary tuberculosis which may not be the symptom or sign of a non-tuberculosis condition, at times of a surgical nature.

Stewart emphasizes that war has its blessings for tuberculosis after all. More accurate diagnosis and more universal resort to treatment in incipient cases; finer institutions for treatment, a saner appreciation of the tuberculous person in the community and a fuller utilization of the tuberculous man for service. These are some of the good things the war has already brought to the problem of tuberculosis.—H. R. M.

EMPYEMA.

Extensive reports of the army medical men regarding the outbreak of respiratory disease at the camps during the past year have appeared. Early in the fall of 1917 an outbreak of pneumonia appeared in all of the camps, either as a primary affection or as a complication of measles. The outbreak assumed the characteristics of an epidemic, reached a fastigium, wore itself out, was followed by a recrudescence, and was practically extinct by the end of the following spring. The clinical picture was marked by the extreme degree of the illness, by the extraordinary numbers of complicating empyemata, by exceptionally rapid development, by an unexpectedly large mortality.

There were two groups: at Camps Wheeler, Beauregard, Hancock, Jackson, Logan, Sheridan

and Travis the pneumococcus pneumonias predominated; at Camps Funston, Dodge, Custer and Lee the pneumonias were due mostly to the hemolytic streptococcus. Cole and McCallum state that the pneumococcus caused ordinary types of lobar pneumonia; that the streptococcus pneumonias usually followed measles and was broncho-pneumonic in character. In some the rapidity of development of the pathological process facilitated an early localization of the lesion in the pleura, so that at post-mortem examinations little or nothing was found in the lung parenchyma, and the little was gathered subparietally and indicated, morphologically, a secondary pulmonary involvement.

In all of the empyemata the rapidity with which the exudate gathered in the pleural cavity was remarkable. In one of the cases described 1,500 cubic centimeters of fluid accumulated within sixteen hours of the primary symptoms. The fluid was rather thin with the streptococcus infections. These were the sickest patients. In some the course was indescribably fulminant with an overwhelming toxemia, and no method of treatment seemed of any avail; in others the picture was of a milder nature, or was slower in development, or the poisoning was more quickly overcome by the natural protective forces of the body. The largest mortality followed the measles empyemata; and was during January.

Numerous methods of treatment were employed. The best method included repeated aspirations of the accumulated fluid until the toxicity of the process had begun to subside; thoracotomy usually without rib resection, and the treatment of the cavity with Dakin's solution. Aspiration alone yielded the worst results.

Within the past eight weeks the wide pandemic-like distribution of influenzal pneumonias was noteworthy for the absence of pleural complications. Indications of their recrudescence are, however, beginning to appear.—A. O. W.

NO MORE PHYSICIANS TO BE COMMISSIONED IN THE MEDICAL CORPS.

At ten o'clock on the morning of Nov. 11th, the War Department discontinued the commissioning of physicians in the Medical Corps.

This condition, in all probability, is permanent and no further consideration will be given applicants for a commission in the Medical Corps until further notice.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

AFTER WAR SURGERY.

The wheels of war have slowed up. The peace station is in sight. The tremendous forces propelling the huge war machine are being braked and speed is reduced to the minimum permissible with safety. The war is over insofar as forces of destruction are concerned, but the struggle for construction and reconstruction must continue for many months to come.

Among the numerous factors entering into the successful conclusion of the world war none has been of greater effectiveness than the organized medical work of the Army, Navy and Public Health Service. The distinctions between military and civil surgery are more than academic, as has been demonstrated by the types of wounds that have been treated, by the character of infections that have existed, by the numerous advances in technic that have been achieved, and by the methods of co-operation which have so successfully grown out of the problems of battle injuries.

In the processes of reconstruction now under way it is highly probable that surgery will be affected. It is difficult to prophecy the far reaching results of military experience upon civil practice. It is permissible to suggest that among the gains to be noted in the future will be found a more complete articulation of the laboratory and clinical side of medicine, even in smaller communities where state aid may be required. The establishment of diagnostic clinics and the alteration of surgical teams into "group medicine" would scarcely be surprising. The extension of Health Insurance, Workmen's Compensation Laws, Maternity Insurance, Ambulance Zone Systems, Central Dressing Stations, and an increase of special hospital facilities would in no way arrive unexpectedly.

The impetus given to surgical specialties will not be lost. The vast experience with plastic technic, the treatment of suppurating wounds, the surgery of the brain and spinal cord, the management of compound and comminuted fractures, oral surgery and malformations due to loss of tissue or scars: the handling of visceral perforations and attendant complications, the care of burns, gangrene and tetanus will be reflected in the improvement of technic in the treatment of accidents and injuries in civil and industrial life. Hygiene, sanitation, prophylactic inoculations, serum therapy, occupa-

tional therapy, shell shock management represent practical fields of effort whose status has been partially fixed by the costly experiment of war surgery.

The surgical standards of the country will have been raised by reason of the gross experience of a large proportion of the medical profession of the country who have had opportunities for self-development and education under government auspices to a degree greater than has ever before been possible in the history of surgery. Radiographers, anesthetists, laboratory workers, and, indeed, surgeons have been developed in large numbers so that all parts of the country will be benefited through the return of these more highly trained and expert surgeons. It is possible, too, that their capabilities will be enhanced by virtue of the remarkable *esprit de corps* and high morale which have been a natural consequence of work under pressure, and in co-operation for the attainment of the splendid results which have marked the service of the medical corps. The closer understanding of medical and surgical problems, the constant interchange of ideas, the release from competition, save along lines of achievement, will bring with it a better spirit and a higher mutual regard and respect among members of the surgical fraternity.

Among the serious problems to be solved, none is greater than that of the re-establishment of surgeons in civil life. The sacrifice of professional work brought about by enlistment creates a situation which cannot be relieved immediately. The gradual return of the medical forces will cover many months, and the process of reassimilation will, therefore, involve a long period of time. It is obvious that all positions formerly held by those now in national service should be open for those desiring to take advantage of them. There is a distinct moral obligation on the part of the profession to aid in every way and facilitate the restoration of professional opportunities to those who so freely gave them up for patriotic reasons. Similarly, there is an obligation to assist in every way possible those who return to secure re-establishment in civil practice. Various difficulties may arise in the rehabilitation of those who have suffered injuries, but fortunately, this number is small, and there should be no obstacles in promoting their successful adaptation to specific fields of effort.

Possibly a small proportion of the medical men will remain overseas to take up their work in foreign lands where the depletion of the medical profession has established large opportunities for men of capability and initiative. Medically speaking, the United States alone of all the belligerent

nations is in a condition of professional balance. The ratio between physicians and population may be decreased without resulting in danger to the vast population, particularly, as our medical colleges have been protected and the graduates therefrom will be adequate to supply the constant needs of our people. The total casualties of the United States probably have not been more than 100,000, but the population will undoubtedly be decreased by reason of the emigration that has occurred, and that will continue as a result of an attempt to reconstruct devastated lands.

The conclusion of hostilities has brought an end to the hazards of war. The total destructive consequences to America numerically are not great. The constructive agencies which have been liberated and developed are innumerable. The evaluation of the achievements of the medical profession is impossible at the present time. It is safe to assert, however, that humanity as a whole has gained by virtue of medical military experience. There will be a greater expression of democracy in medicine and medical practice. The spirit of humanity for which the war was fought will be elevated through the greater service stimulated by the loyalty, devotion, enthusiasm, and conscientious efforts of the more than 33,000 medical men whose service stars adorn the honor flag of the medical profession.

Book Reviews

Anatomy of the Human Body. HENRY GRAY, F.R.S., Fellow of the Royal College of Surgeons; Lecturer on Anatomy at St. George's Hospital Medical School, London. *Twentieth edition.* Thoroughly revised and re-edited by WARREN H. LEWIS, B.S., M.D., Professor of Physiological Anatomy, Johns Hopkins University, Baltimore, Md. Illustrated with 1247 engravings. LEA & FEBIGER, Philadelphia and New York, 1918.

Sixty years ago the first English edition of Henry Gray's anatomy was published. The first American edition followed in 1859. Although the twentieth edition has been thoroughly revised and re-edited, it still follows the general plan outlined in the first edition. It continues to be the foremost descriptive anatomy in the English language.

The present edition differs from its predecessors in that special sections on Embryology and Histology have been distributed among the subjects under which they naturally belong. Recent advances in the study of the ductless glands and nervous systems are reflected in the re-writing of the sections dealing with these subjects.

With the enrichment of the text by numerous illustrations, with the modernization of the descriptive matter, the editor has succeeded in bringing this exemplary volume abreast of modern anatomical science. Gray's Anatomy continues to deserve the high and incontestable position among the works of anatomy, whether in the hands of the student, specialist, or the general practitioner who desires at times to refresh his mind or to refer to a substantial and reliable authority for guidance in the performance of his daily tasks.

Surgical and War Nursing. A. H. BARKLEY, M.D. (Hon.), M.D., F.A.C.S., Lecturer at Good Samaritan Hospital Training School for Nurses; Consulting Surgeon, Good Samaritan Hospital, Lexington, Ky. With 79 illustrations. St. Louis: C. V. MOSBY COMPANY, 1918. Pp. 201. Price, \$1.75.

War nursing has produced numerous little problems differing somewhat from the ordinary routine of civil nursing practice. As a special book for students of nursing, the author has presented material derived from his experiences as a lecturer and as a surgeon in the United States Army, together with the information gleaned by his familiarity with recent surgical technic as modified by military conditions during the present war. The work is well arranged, excellently illustrated, and covers the general field indicated by the title in a most satisfactory and helpful manner.

The Surgery of Oral Diseases and Malformations. Their Diagnosis and Treatment. GEORGE VAN INGEN BROWN, D.D.S., M.D., C.M., F.A.C.S., Major, Medical Officers' Reserve Corps, U. S. Army; Oral Surgeon to St. Mary's Hospital and to the Children's Free Hospital and Columbia Hospital, Milwaukee; Fellow of the American Medical Association; Member of the National Dental Association; Chairman of the Section on Oral Surgery of the Fourth International Dental Congress, etc. *Third Edition.* With 570 engravings and 20 plates, and a selected list of examination questions. LEA & FEBIGER, Philadelphia and New York, 1918. Pp. 703. Price, \$7.00.

No phase of war surgery has been of greater worth than that devoted to the repair of mutilations of the jaws and face that have arisen from the use of high explosives. Oral and plastic surgery has achieved unusual eminence in the restoration of human faces to some shadow of their former form. The third edition of Brown's valuable book is rich in material, illustrative of the accomplishments of oral and plastic surgery. Its full value, however, is not dependent merely upon the description of the treatment of wounds under war conditions. Throughout the entire volume there is evidence of careful compilation of practical and useful methods for the surgical treatment of all the oral diseases and malformations which afflict man. There is a happy combination of viewpoint of the dentist and the surgeon with an appreciation of the practical importance of their co-operation in the attainment of the best results of treatment.

The general plan of previous editions has been followed, though almost every chapter has been improved by virtue of added new material or a re-statement of facts in the light of greater knowledge. The advancement of oral surgery is well reflected, and the new edition is most welcome to those students carefully observing the development of a new specialty in surgery.

Surgical Applied Anatomy. By SIR FREDERICK TREVES, Bart., G.C.V.O., C.B., LL.D., F.R.C. Eng., Serjeant Surgeon to H. M. the King; Consulting Surgeon to the London Hospital; late Lecturer on Anatomy at the London Hospital. *Seventh Edition,* revised by ARTHUR KEITH, M.D., LL.D., Aber., F.R.C.S. Eng., F.R.S., Hunterian Professor and Conservator of the Museum, Royal College of Surgeons of England; formerly Lecturer on and Senior Demonstrator of Anatomy at the London Hospital; Examiner in the Universities of Aberdeen, Cambridge, etc., and W. COLIN MACKENZIE, M.D., Melb., F.R.C.S. Edin., F.R.S.E. Member of Council of the Anatomical Society of Great Britain and Ireland; formerly Lecturer on Applied Anatomy, University of Melbourne. Illustrated with 153 figures, including 74 in colour. LEA & FEBIGER, Philadelphia and New York. Pp. 674. Price, \$3.00.

Thirty-five years is a long life for any book. None, however, has been of more service to the student of surgery than the work so familiarly known as Treves' Applied Anatomy. Additional material has been added by the present authors of the seventh edition, particularly along the line of what they have termed "Orthopaedic Anatomy."

The excellence of this book has not added very much to the reputation of a man naturally wherever his work is required. It has been made its field of service is now greater than ever when haste is demanded to increase the general surgical knowledge sufficient to allow the present work to be of some use. Its accuracy and usefulness it continues the high standard of excellence which has ever distinguished this book since its celebrated author sought to prepare for the profession a book which "should make the dry bones live."

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by EDWARD AVERY HARE, M.D., and LEONARD J. APPLEMAN, M.D. Volume III, September, 1918. LEA & FEBIGER, Philadelphia and New York, 1918.

With the excellence of *Progressive Medicine*, the September issue presents the usual digest of improvements, advances and discoveries in medical and surgical science. The subject matter included in Vol. III are Diseases of the Thorax and Its Viscera, Including the Heart, Lungs and Blood Vessels, by William Ewart, M.D., F.R.C.P.; Dermatology and Syphilis, by William S. Gottheil, M.D.; Obstetrics, by Edward P. Davis, M.D.; Diseases of the Nervous System, by William G. Spiller, M.D.

The wonted high standard of value is enhanced by the review of articles on Gas Therapy and Transfusion, and the discussion of Anesthetics in Labor, together with the Relation of the Glands of Internal Secretion to Obstetrics.

Fibroids and Allied Tumors (Myoma and Adenomyoma). Their Pathology, Clinical Features and Surgical Treatment. By HENRY LOCKYER, M.D., B.S., F.R.C.P., F.R.C.S., Vice-President Obstetrical and Gynecological Section, Royal Society of Medicine; Obstetric Physician to Out-Patients, Charing Cross Hospital; Corresponding Member of the Société Obstétrique Belge, etc., etc. With an introductory notice by ALBAN DORAN, F.R.C.S. With 316 illustrations, including 37 coloured plates. MACMILLAN & Co., Ltd., St. Martin's St., London, 1918. Pp. 603, octavo. Price, \$25.00.

The present volume on Fibroids is not the most exhaustive treatise on this most common of uterine tumors that has appeared in the literature. It is nevertheless as comprehensive as any book dealing with this subject need be.

The chief feature of the book is the discussion of the pathology of fibroids, the material for the description of which has been especially abundant. The author lays, with proper justification, special emphasis on this important aspect of fibroids and his ample personal observations are sufficiently rich to entitle him to describe in his own way the pathology of myomata. For clearness of description of the histogenesis, gross development, and secondary changes of these tumors we have not met its equal.

Not an unimportant feature of the book is the attention given to the changes in neighboring organs associating myomata and also to the question of a complicating pregnancy. This last chapter, in the light of the author's unusually large experience, is a distinct contribution and may well serve as a guide in the management of any case of myoma in a pregnant uterus. The author favors the continuance of pregnancy to term whenever feasible and unless urgent symptoms, as torsion of the myoma, should require surgical interference. At term, one of several surgical procedures is then to be followed in order that a live baby may be delivered. Not infrequently a tumor which appears to threaten obstruction may be displaced in the course of the pregnancy or at term during labor and a living child be born per viam naturalis. Where dystocia is actually threatened one of the well established classic procedures may be followed with the view of a favorable delivery. If a myomectomy be for some reason determined upon, the author states that the gravid uterus is tolerant to a considerable degree of surgical manipulation.

Myoma occurring in extra uterine tissues and organs receives extensive detail in the book. But the special type of myoma—the adenomyoma—engages the author's atten-

tion in the second part of the book. Lockyer follows Cullen's classic work on this subject and amplifies it, enlarging the pathology of adenomyoma by a new classification. The clinical features of this, as well as of the more common tumor, the myoma, receive careful attention and operative indications are clearly laid down in accordance with the mature experience of the author.

Part III deals with operations for myoma and includes a chapter on the treatment of post-operative and pre-operative pelvic and abdominal complications. The author adheres strongly to the belief that no one should undertake the surgery of the pelvis unless he has the requisite knowledge and experience to deal with intestinal and other complications.

The book is profusely and beautifully illustrated in a manner not unkind of those of Howard Kelly and Cullen's publications. To these latter authors, Lockyer expresses his indebtedness for a number of illustrations on adenomyoma.

Genitourinary Diseases and Syphilis. HENRY H. MORTON, M.D., F.A.C.S., Clinical Professor of Genitourinary Diseases in the Long Island College Hospital; Genitourinary Surgeon to the Long Island and Kings County Hospitals and the Polhemus Memorial Clinic; Member of Committee on Venereal Diseases in the Office of the Surgeon-General; Consulting Genitourinary Surgeon to the Flushing Hospital, to the Sea View Hospital of Department of Health, New York City; to the Bushwick Hospital, and to the Beth Israel Hospital of Newark, N. J.; Member of the American Association of Genitourinary Surgeons; Member of the American Urological Association; Fellow of the American College of Surgeons; Fellow of the New York Academy of Medicine, etc. *Fourth Edition*, Revised and Enlarged. With 330 Illustrations and 36 Full-Page Colored Plates. St. Louis, C. V. Mosby Company, 1918. Pp. 794. Price \$7.00.

Re-writing surgical books during war periods does not enable the author to bring to bear a full weighing of all the evidence regarding technic. Despite this fact, the Fourth Edition of Morton's book is acceptable because the newer discoveries and methods that have been evaluated are given due space and treatment. Particularly valuable is the discussion of the high frequency current in the treatment of benign tumors of the bladder and the presentation of the general subject of the diagnostic value of the urines, together with a discussion of the intensive method of using salvarsan and mercury.

The general arrangement follows that of the preceding editions, and the illustrative material continues to be rich in variety and unusually well selected from the standpoint of clarifying the text. As a standard book upon the subject, the author has been peculiarly fortunate because of the splendid cooperation he has received from the publishers insofar as typographical work is concerned.

Concerning Some Headaches and Eye Disorders of Nasal Origin. GREENFIELD SLUDER, M.D., Clinical Professor and Director of the Department of Laryngology and Rhinology, Washington University Medical School, St. Louis, 115 illustrations. C. V. Mosby Company, St. Louis, 1918.

A well written, somewhat verbose essay on a subject of tremendous interest to the rhinologist and, when its significance is more widely comprehended, to the internist and neurologist as well. Dr. Sluder has presented most of the subject matter in various papers during recent years, his first contribution being in 1900. The book is well and profusely illustrated. The text is good. The author, with his vast knowledge of his subject and a desire to make his points definite and unmistakable, repeats himself often and tends to become a little involved.

There is an introduction by Dr. Jonathan Wright, who has done the pathological studies necessitated by the investigations. His part deals with the microscopic anatomy and pathology of the subject of the essay. The main body of the book is in three chapters. The first, Vacuum Frontal Headaches with Eye Symptoms only. There is a short description of similar ethmoidal headaches.

Chapter two deals with the Syndroms of Nasal Ganglion Neurosis and the author describes his method of treatment and points out why the technic has not been as successful in some other hands as in his own.

In the last chapter he takes up hyperplastic inflammation of the sphenoid sinuses and discusses it in the relation of the sinuses to the second, third, fourth, fifth and sixth cranial nerves, the Vidian nerve and the nasal ganglion. A description of his technic for nasal accessory sinus operations follows.

The book concludes with a number of case histories illustrative of the text.

The Doctor's Part. What Happens to the Wounded in War. JAMES ROBB CHURCH, A.M., M.D., Colonel Medical Corps, U. S. Army. With Foreword by MAJOR-GENERAL WILLIAM C. GORGAS, Surgeon-General, U. S. Army. Illustrated. D. APPLETON AND COMPANY, New York, London, 1918.

Books about the war are almost as numerous as the sands of the sea, but there is always room for one which is as expressive of the life of the surgeon in military activity as the one written by Dr. Church. He has presented in simple and most readable non-technical English a vast amount of information which he selected from his storehouse of experience as an observer with our Allies, and later as a member of the staff of the Commanding General of the American Expeditionary Force. To be at home but to feel the touch of war with the part that the physician plays, one needs but to read this most interesting, refreshing, and stimulating book.

Books Received

Dispensaries. Their Management and Development. A Book for Administrators, Public Health Workers, and All Interested in Better Medical Service for the People. MICHAEL M. DAVIS, JR., Ph.D., Director of the Boston Dispensary, and ANDREW R. WARNER, M.D., Superintendent of Lakeside Hospital, Cleveland. New York: THE MACMILLAN COMPANY, 1918. Price, \$2.25.

Abstracts of War Surgery. An Abstract of the War Literature of General Surgery that has been Published Since the Declaration of War in 1914. Prepared by the Division of Surgery, Surgeon-General's Office. St. Louis: C. V. MOSBY COMPANY, 1918. Price, \$4.00.

Roentgen Diagnosis of Diseases of the Head. DR. ARTHUR SCHULLER, Head of the Clinic for Nervous Diseases at the Franz-Joseph Ambulatorium, Vienna. Authorized translation by FRED F. STOCKING, M.D., M.R.C. With a Foreword by ERNEST SACHS, M.D., Associate Professor of Surgery in Washington University. Approved for publication by the Surgeon-General of the United States Army. St. Louis: C. V. MOSBY COMPANY, 1918. Price, \$4.00.

Vaccines and Sera. Their Clinical Value in Military and Civilian Practice. A. GEOFFREY SHERA, B.A., M.D., B.C., Cantab., M.R.C.S. Eng., L.R.C.P. London; Honorary Captain R.A.M.C.; Clinical Pathologist to the British Red Cross Hospital, Netley; late Clinical Pathologist, Central Military and V. A. D. Hospitals, Eastbourne; late Clinical Assistant (medical) Evelina Hospital for Children, S.E.; late R. M. O. Fulham Infirmary, S.W. With an introduction by SIR CLIFFORD ALLBUTT, K.C.B., M.D., F.R.S., Regius Professor of Physics, University of Cambridge. London: HENRY FROWDE, HODDER & STOUGHTON, OXFORD UNIVERSITY PRESS, Warwick Square, E. C., 1918.

Progress in Surgery

A Résumé of Recent Literature.

Avoidable Traumatic Abdomen. J. B. DEEVER, *Journal American Medical Association*, October 5, 1918.

The text is of a patient who had been operated on twelve years before and in which he found a hemostatic forceps, 8 inches long, one-half in the sigmoid and the other half in the lower ileum which it and perforated, producing a spontaneous ileosigmoidostomy. The case seems unique in the length of time the foreign body had been carried without causing trouble and the unaccountable manner in which it had separated and found lodgement in different parts of the bowel. In spite of the purulent peritonitis with adhesions, some of which it was unadvisable to separate, the patient made an uneventful recovery and was discharged in good condition one month after operation. The methods used to prevent such accidents are often cumbersome and are all liable to fail. In the last analysis the proper organization of the operating room is the vital factor for the prevention of such mishaps. The essentials are absolute quiet, a permanent staff of well trained, reliable assistants, each assigned to a particular task, whose conscientious and concentrated attention to this task and unremitting persistence in tracing any piece of gauze or instrument that may be missing is second only to the vigilance of the operator himself. Fortunately a beneficent provision of nature protects the peritoneal cavity to a large extent, but more often this entails a secondary operation immediately after the first or, as in the case reported, at a remote period. The outcome, however, is not always so lucky, as death or troublesome complications occur in more than a quarter of the cases. Other avoidable traumas are perforations of the uterus by use of too sharp curets. The fingers of the experienced surgeon are better than any curet, and still another avoidable traumatism is rupture of the uterus from carelessness or ignorance of the obstetrician or the reckless use of pituitary extract. The safest course in treating such an accident is abdominal section, but everything possible should be done to avoid it. Lastly, Deever speaks of the use of nitrous oxid gas, which he has found useful for short operations, but does not advocate for more extensive and prolonged work. It does not give complete anesthesia or relaxation, and the amount of gas to be given is difficult to determine and is apt to divide the surgeon's attention more than with ether anesthesia in the hands of a competent anesthetist.

Gunshot Abdominal Wounds. J. R. EASTMAN, *Journal American Medical Association*, September 28, 1918.

There is a discussion on the advances that have been made in the treatment of abdominal gunshot wounds during the present war. Notwithstanding the fact that experience has modified the old views as to the advisability of delay in abdominal wounds, there still remains a sharp difference of opinion, notably in France, between those who trust to the development of symptoms for the diagnosis of penetration and perforation and those who prefer early laparotomy. There is not always an aperture of exit of the bullet to show its course. All missiles may ricochet, and Eastman has seen cases where, if it had followed a direct route, many vital organs would have been perforated and yet there was no serious injury. There are a few recognized rules to follow. The closer together the entrance and exit the less the chance of penetration, and Rochard declares that if a man does not cease to complain of abdominal pain a perforation is almost certain. Rochard also says that if a patient passes gas at the anus there is no perforation. All rules fail sometimes, excepting these three which show perforation: escape of bowel contents from the wound, protrusion of perforated intestine at the wound, and passing of the missile by the anus. The common signs of perforation are enumerated, such as pain, costal breathing, shock, abdominal rigidity, retraction of the testicle, etc., and the author adds the symptoms also of abdominal hemorrhage. Any of these may suffice to determine the propriety of operating. Among the deciding

criteria are the nature of the missiles, whether smooth, deformed, etc. The question of transportation, the permanence or nonpermanence of the operative station, and the factor of time are to be taken into account. At the beginning of the war all surgeons were abstentionists, and Eastman gives statistics of operations by both methods which seem, if anything, more favorable for the interventionist. What may be called the internationally accepted treatment in nonoperative cases consists in rest in the recumbent position with shoulders raised and knees flexed. If the patient is moved before operation the Fowler position should be maintained during transport. Of course, abstention from food and care as to administration of water and anodynes are included. The more common injuries to the intra-abdominal organs, their symptoms and treatment are described at length, as are also those of combined injuries of the chest and abdomen, which are not uncommon.

Dakin's Solution and Dakin's Oil in the Normal Peritoneal Cavity of the Dog. E. G. GREY, Baltimore, *Johns Hopkins Medical Bulletin*, Oct., 1918.

Both the neutral solution of chlorinated soda (Dakin's solution) and dichloramine-T in chlorinated paraffin (Dakin's oil), when injected into the normal peritoneal cavity of a dog, lead to an inflammatory reaction, the degree of which is directly proportional to the amount of chlorin antiseptic used. With a sufficient quantity (less of the oil suffices) death ensues.

When either of the chlorin antiseptics is injected into the gall-bladder of a dog no abnormal symptoms appear. Following the injection of the oil, however, the gall-bladder becomes thickened and shrunken, though the remainder of the biliary tract shows no discernible changes.

A small amount of Dakin's oil, when injected into the normal pleural cavity of an anesthetized dog, may lead to a rapid (reflex?) death.

Since Dakin's oil, particularly, has been used without recognizable ill effects in certain infections of the abdominal cavity, the results from the experiments outlined above suggest that the wall of an abscess cavity or sinus must play an important part in protecting the peritoneum in general from the effects of the free chlorin. They also suggest that the maintenance of an adequate drainage tract is an indispensable part of the technic for using antiseptics of this nature within the abdomen. Until more evidence is at hand, then, both of the chlorin antiseptics should be used in intra-abdominal infections with caution and certainly only in carefully selected cases.

Mesenteric Vascular Occlusion. ARTHUR A. EISENBERG, A.B., M.D., and HENRY A. SCHLINK, A.B., M.D., *Surgery, Gynecology and Obstetrics*, July, 1918.

Mesenteric vascular occlusion is not an extremely rare condition, there now being collected about 400 cases.

The occlusion is most frequently in the arteries. By far the most common lesion produced is hemorrhagic infarction of the intestine.

The most common cause of the occlusion is embolism resulting from infection and injury.

There is no difference clinically between the arterial and venous occlusion, regardless as to whether it is due to embolism or thrombosis, in the superior or inferior vessels.

The clinical diagnosis should be made on sudden onset, acute colic-like abdominal pain, distention and tenderness, signs of shock and collapse; often there may be vomiting and constipation; if diarrhea is present, it is most always accompanied by melena.

Cautery Excision of Gastric Ulcer. D. C. BALFOUR, *Annals of Surgery*, June, 1918.

Balfour summarizes the advantages of this method: The cautery efficiently destroys the focus of infection without sacrificing nature's protective surrounding area of induration. The method may be applied in a large number of lesions and entails a minimum of risk; the motor functional result is superior. It obviates early and late postoperative hemorrhage. The late results are better. It can be used where other methods are not available. It should always be accompanied by gastro-enterostomy.

Acute Dilatation of the Stomach. WILLIAM DOOLIN, *British Journal of Surgery*, July, 1918.

This condition is apparently of more frequent occurrence than is usually believed and the primary distending agent is probably air swallowed during the narcosis. Gastric distention is followed by duodenal obstruction, and gastric atony is necessary for its occurrence. Early recognition and the prompt use of the stomach tube is necessary to prevent the secondary duodenal obstruction. When fully developed operation is unnecessary because of its futility. Use of the prone position and the replacement of the fluids lost have saved many desperate cases.

The Use of Fascial Transplants in War Surgery. L. C. BALLEUIL and W. D. JACK, *Annals of Surgery*, July, 1918.

Experiences are described of the use of aponeurotic grafts for the repair and restoration to function of scars, of muscles, tendons, or nerves, for which physiotherapy is useless. The operative technic is simple and includes the complete excision of the old scar into healthy tissue before the graft is applied.

Surgery vs. Radium in the Treatment of Carcinoma of the Bladder. B. S. BARRINGER, New York, *New York State Journal of Medicine*, Nov., 1918.

Barringer has attained most encouraging results in the treatment of 43 cases. Most of these (41) were in the advanced inoperable stage. Of the latter five are well (the longest 23 months), as determined by cystoscopic examination. He believes that radium has a distinct advantage over surgery in the treatment of cancer of the bladder.

Observations of Bladder Injury in Warfare. COL. ANDREW FULLERTON, *British Journal of Surgery*, July, 1918.

Injuries of the bladder form a very small number of the total wounds and derive their importance from the associated injuries, which latter include those of the bones of the pelvic girdle, and especially of the rectum and small intestine. Pelvic cellulitis is a frequent complication. The mortality is approximately 30%. The chief sequelæ are necrosis of bone, persistence of cystitis, calculus, and stricture formation at the neck of the bladder. Accumulation of infected fluid, blood clot or feces must be prevented by attention to the original wounds, aided, if necessary, but suitably planned incisions. Attention is necessary to the pelvic cellular spaces as well as to the interior of the bladder. The after-treatment should include frequent bladder irrigations to prevent cystitis and stone formation.

A Note on the Treatment of Wounds of the Genital Organs in Warfare. CHARLES CUMSTON GREENE, *Annals of Surgery*, September, 1918.

Wounds of the scrotum and testicle are fairly common. In simple contusions simple humid dressings suffice. Foreign bodies should be immediately removed. Not uncommonly the gland protrudes through the wound. The protrusion should be reduced after proper cleansing and should be covered, as far as possible, with its tunica. In bad cases the organ should be covered with a wet dressing and developments awaited. Simple irreducibility of the gland is never an indication for primary castration. When the gland is outside its coverings for a number of days, it is withered and castration may be necessary; in this case account should be taken of the neighboring organ.

Diverticula of the Bladder. E. S. JUDD, *Annals of Surgery*, September, 1918.

The general features of a series of 44 cases are described and the results are given; all but ten are living. Two of the patients died within a few days after a drainage operation from septic kidney conditions. The other deaths occurred after the patients had gone home. The general and functional results in the remaining 34 cases were good.

The Surgery of the Double Kidney. YOUNG and DAVIS: *Surgery, Gynecology and Obstetrics*, July, 1918.

The condition of double kidney and ureter is not rare, and the upper half is most often the seat of disease; its surgical importance is therefore great. The advent of ureteral catheterization, radiography and pyelography has made the diagnosis easy and we should expect the discovery of more cases in the future. The radical cure by excision of the diseased half of the kidney with its pelvis and ureter is undoubtedly the method of choice.

Sacro-Iliac Relaxation. W. B. OWEN, *Journal American Medical Association*, October 5, 1918.

A discussion on the frequency of recurrence and persistence of pain and discomfort incident to relaxation of the sacro-iliac synchondrosis, following child birth, prolonged illness and excessive pelvic strain as indicating the need of better devices for a more efficient type of support for these cases. The greatest difficulty in the use of such apparatus, so far devised, has been the maintenance of continuous support. While claiming no originality for the device here described, Owen says he has had no knowledge of a similar one so far, but if such exists he can recommend it from his own experience. "To insure proper results, the device must be maintained in such a position that the lower border is on a line with the greater trochanter and the pubic arch, and at a corresponding level over the sacro-iliac joint. In other words, the support must be maintained as low as possible, and at the same time allow the patient to assume the sitting posture without discomfort. No matter how carefully applied the ordinary belt will invariably slip upward, and where perineal straps are used to prevent this they cause so much discomfort from pressure on the perineal region that it becomes necessary to loosen them, and the supportive efficiency is thereby lost. It has been my practice to have the apparatus made of bleached drilling doubled, the fixation skeleton resembling a pair of short pants extending from the crest of the ilium to the middle of the thighs following the gluteal fold, with a loop on each side through which passes a heavy elastic belt $1\frac{1}{2}$ inches wide. The best results will be obtained by having the support fitted directly to the patient before it is completely finished." The author has used this particular type of support in more than 200 cases of sacro-iliac relaxation or strain. And, excepting in two non-typical cases, has completely relieved the symptoms. Twenty-four of the patients came to his office on crutches. All have been closely followed.

Mechanical Derangement of the Knee-Joint. MELVIN S. HENDERSON, *Annals of Surgery*, June, 1918.

These derangements are usually produced by a damaged internal semilunar cartilage, by loose osteo-cartilaginous bodies, and by the external semilunar cartilage. Loose bodies of extrinsic origin produce derangements but are not frequent in civil practice. Loose bodies per se demand removal. A history of mechanical derangement owing to a damaged semilunar cartilage should not be operated, unless the locking is repeated or reduction cannot be accomplished in any other way. In properly selected cases the operative results are excellent.

The Treatment of Gunshot Wounds of the Face, Accompanied by Extensive Destruction of the Lower Lip and Mandible. MAJOR V. H. MAZANJIAN and CAPTAIN HAROLD BURROWS, *British Journal of Surgery*, July, 1918.

The early treatment includes those of shock and hemorrhage and of sepsis, which last is usually not severe and becomes rectified within a few days. The special dangers include obstruction of the glottis, because the parts fall back, having no support to hold them up in front. Sometimes raising the wounded into a sitting posture is sufficient; when not, tracheotomy is necessary. Another danger is an inhalation pneumonia. A general anesthetic is therefore contraindicated. The patients are fed by a nasal or small oesophageal tube.

The mandibular function is restored by preventing deformity or displacement of the remaining fragments and by a removable splint which is inserted between the frag-

ments. The buccal furrow is carefully retained, or is re-established by an appropriate incision with the addition to the apparatus of a suitable flange.

The restoration of the lower lip makes use of the skin of the cheeks and neck by various plastics which are described and illustrated in the text.

Atlas and Axis Luxation. CHARLES M. JACOBS, *American Journal of Orthopedic Surgery*, October, 1918.

Many cases of suddenly acquired rigid neck, associated with abnormal positions of the head, which cannot voluntarily be corrected, are probably subluxations of the atlas. The reported cases of distention luxation seem to show that there is a distinct affection resulting from infection which is not associated with trauma. In traumatic dislocations the severity of the symptoms and prognosis are proportionate to the amount of force expended. Great force need not necessarily produce dangerous compression, if sufficient support and time are afforded for repair to take place. Again, sufficient force applied to the atlas could prove fatal immediately. If the atlas dislocation is the result of a lesser force the striking thing is the mild symptoms resulting. The treatment of distention luxation is no different than in traumatic luxation. The method of reduction by manipulation under anesthesia is not without danger in either variety. The most essential feature after reduction has been accomplished is the immobilization of the head until the ligaments have had time to heal. Operative procedure, as devised by Mixter, is advisable when reposition of the vertebra has not been accomplished by other methods.

Laminectomy and Regional Anaesthesia. CHARLES H. FRAZIER, *Annals of Surgery*, July, 1918.

Regional anesthesia is appropriate in the thoracic region of the spine. A method of paravertebral anesthesia has been elaborated for the cervical region, but because of danger to the phrenic nerve, infiltration anesthesia is recommended. In the lumbar region spinal anesthesia is the method of choice. The mortality of laminectomy per se has been reduced to that of an exploratory laparotomy.

Treatment of Fracture of the Neck of the Femur.

FRED. H. ALBEE, *American Journal of Orthopedic Surgery*, August, 1918.

The various methods of treating fracture of the neck of the femur is discussed and the various disadvantages of each are commented upon. The author's practice is to make use of a bone-graft peg in every operable case in which the fragments are loose or unimpacted. The steps in the operation are described.

Gunshot Fractures of the Mandible. JOHN B. ROBERTS, *Annals of Surgery*, September, 1918.

Gunshot fractures of the mandible are essentially open fractures and in most cases osteomyelitis and other infections follow. Necrosis may impede union. Violent primary or secondary hemorrhage may occur. Unintelligent treatment may cause union to occur with great deformity, malocclusion of the teeth, or facial disfigurement of the scar. The various methods are described for correctly treating this injury. The best results are obtained by dentist and surgeon working together. Bone transplantation operations, and various plastics are constantly necessary.

Sur L'amputation de Cuisse en Chirurgie de Guerre (Thigh Amputations in War Surgery.) J. MARTIN, *Revue de Chirurgie*, January-February, 1918.

Indications and the technic of the operation are given. When properly performed under general anesthesia there is no extraordinary risk. The bad results of the cases in the early part of the war were due to improperly performed operations, and those done at too late a period. Brilliant results were obtained with gas gangrene, and the amputation did not seem to aggravate the infection. Very satisfying results were obtained with the ordinary grave infections.

Notes on Excisions of Joints. ROBERT E. OSGOOD, *American Journal of Orthopedic Surgery*, October, 1918.

This paper deals only with the question of excision of joints for the control of sepsis and not with the primary excision to prevent sepsis and gain first intention healing, after the method of superiosteal resections as advocated by Le Riche. By present methods, if the cases can be operated upon within 24 hours, these septic joints ought not to occur but they will probably continue to be encountered often enough to make the policy of their

as natural modifications of primary duct formations. The most common one, viz., the peritheliomatous formation, is a ligament without histological basis.

Injury, such as localized or partial obstruction of ducts, probably plays a prominent part in the origin of these tumors.

The cartilage is developed from the epithelium of the parenchyma of the tumor. This claim will undoubtedly meet with strong opposition.

The Endobronchial Treatment of Bronchiectasis and Bronchial Abscess. E. MAYER, New York, *New York Medical Journal*, Oct. 19, 1918.

This method was introduced by Yankauer about a year and a half ago, and the method has been continued by Mayer, who reports the progress thus far. Yankauer has devised a double bronchoscopic tube, one being used for suction, the other for irrigation. After a preliminary morphinization and cocaineization the bronchoscope is introduced into the abscess cavity, and the secretion is sucked out; the cavity is then irrigated with saline solution, which if well borne, is followed by an irrigation with an iodine and carbolic acid solution. The treatment is done twice weekly without any serious result. So far Mayer believes the results of his method of treatment show that distinct progress has been made; the secretion is less, the odor has disappeared and the general condition of the patient has improved.

The Advisability of Totally Excising Both Pectoral Muscles in the Radical Operation for Cancer of the Breast. WILLY MEYER, *Annals of Surgery*, July, 1918.

The total extirpation of both pectoral muscles in their undisturbed and uninvaded anatomical connection with relation to the breast, as described in this communication, is claimed to offer an additional safeguard not only against local and regional recurrences, but in all probabilities, also against metastasis.

The Prognosis and Treatment of Empyema. JOHN HOBBS, *Annals of Surgery*, June, 1918.

Humans differs from Lilienthal in regard to the need for the latter's operation of major thoracotomy for empyema; and pleads for a more careful study of the empyema cavity before (if possible), during, and after the original drainage operation with the idea of adopting at the earliest favorable moment the particular procedure, if any, which is essential to healing. Having this in mind the original operation would properly consist in rib resection as the safest life-saving measure.

The After-Effects of Wounds of the Chest and Their Treatment. JOHN MEAKINS and T. W. WALKER, *Canadian Medical Association Journal*, October, 1918.

Deformity of the chest wall is a very important disabling after-effect of gunshot wounds of the chest. This deformity follows most frequently prolonged involvement of the pleural cavity. The early and persistent evacuation of fluid from the pleural cavity, either by aspiration or operation, is of great importance in preventing the development of deformity. Especially is this so in cases of hemothorax. The early use of special exercises is beneficial in preventing or overcoming this deformity. The prognosis in this condition is exceptionally good under suitable treatment.

Mixed Tumors of the Salivary Glands. FRASER, M.D., *Surgery, Gynecology and Obstetrics*, July, 1918.

The mixed tumors arise from the ducts of adult glands. No claim is made that true neoplasm has been experimentally produced, but the experimental results justify the conclusion that the primary structures of the mixed tumors may easily arise from the ducts of the adult gland.

The endothelial theory has no foundation in fact. All the so-called endothelial structures are easily explained

The Action of Chlorine on Suture Material. G. L. SERVASS, Reno, *Medical Record*, Oct. 12, 1918.

Servass had occasion to sew a superficial wound with silkworm and chromic acid gut and applied a wet dressing saturated with one of the chlorinated compounds. At the end of ten days he found to his amazement that both the silkworm and chromic suture had softened up just as ordinary catgut would. He thereupon experimented by placing silkworm gut and even silk in test tubes covered with the same percent chlorinated solution as was used on the dressing and found that at the end of a few days both were useless as suturing material. The author warns therefore against the application of chlorinated dressings in instances where such materials are used and when it is important that the sutures should hold for a long time, as for instance, in laparotomy wounds.

Primary and Delayed Primary Suture of Gunshot Wounds. Report of Research Committee, CAPT.

FORBES FRASER, Director, *British Journal of Surgery*, July, 1918.

Wounds infected with hemolytic streptococcus nearly always become infected, and usually there was marked supuration with severe constitutional disturbances. The advantage of delaying the primary suture consists in the fact that after two or three days, even when cultures are not made, the appearances of the wound are so distinctive, as to enable one to say whether the wound ought or ought not to be sutured.

It is possible to suture a large number of the wounds, after thorough cleansing without the use of antiseptics and obtain union. The wide excision, recommended by the French, is not advisable in all cases, as it may leave a useless limb.

A bullet track made by an undeformed bullet is usually sterile; when the wound of exit is large and that of entrance is small and track-like, only the exit wound is apt to be infected.

Fibrin Paper as a Hemostatic Agent. SAMUEL CLARK HARVEY, *Annals of Surgery*, July, 1918.

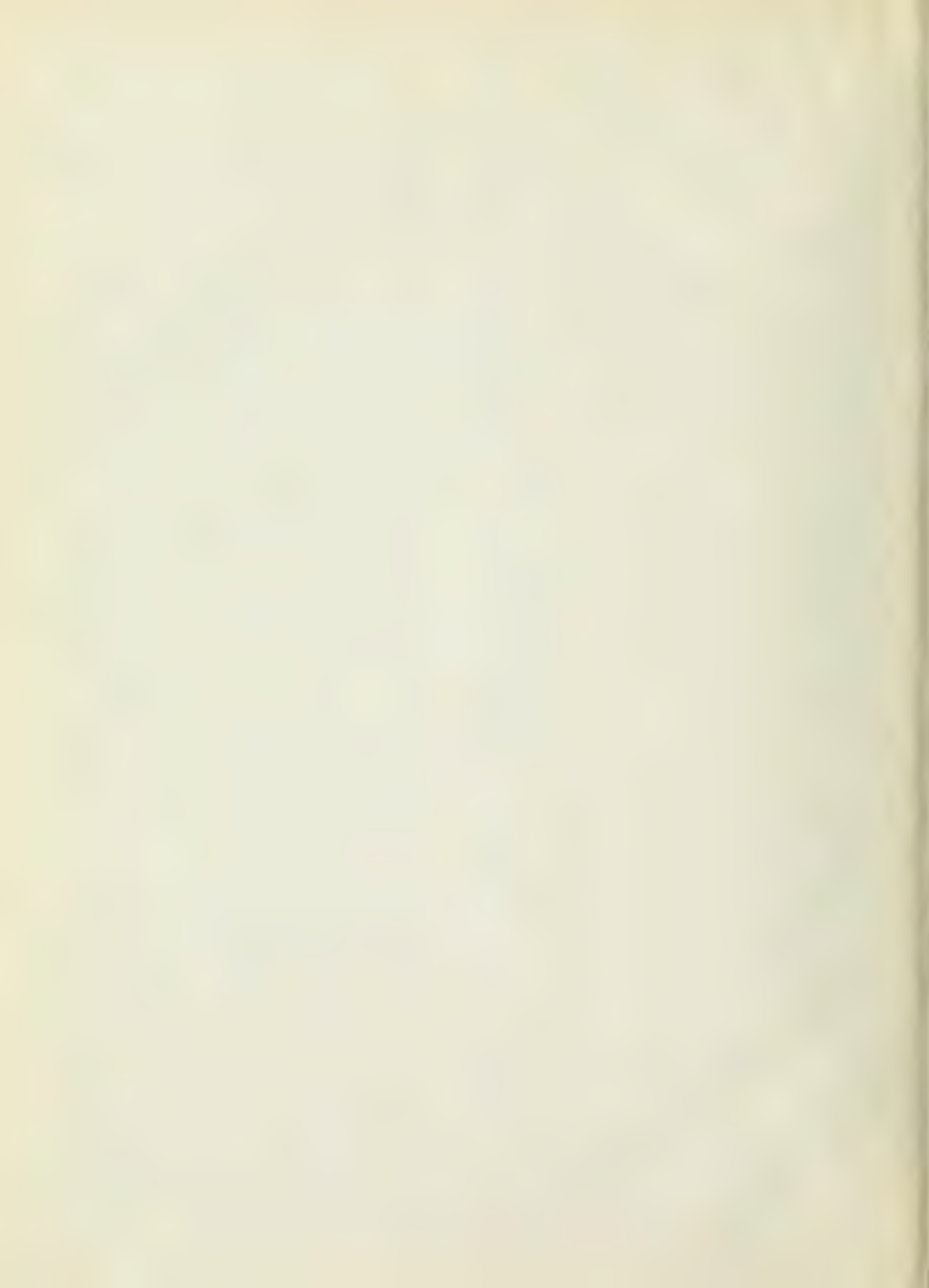
Bleeding from many small vessels, from vessels in delicate tissue and from sinuses can be controlled by the application of fascia, muscle and fibrin. The peculiar advantage of the use of these tissues is that they can be left within the wound, thus avoiding the danger of stripping the coagulum. A method is described for converting fibrin into a fabric easily kept, sterilized and applied. This material is found to correspond in effectiveness and amenability to absorption with the untreated fibrin, while being far more adaptable to the operating room technic.

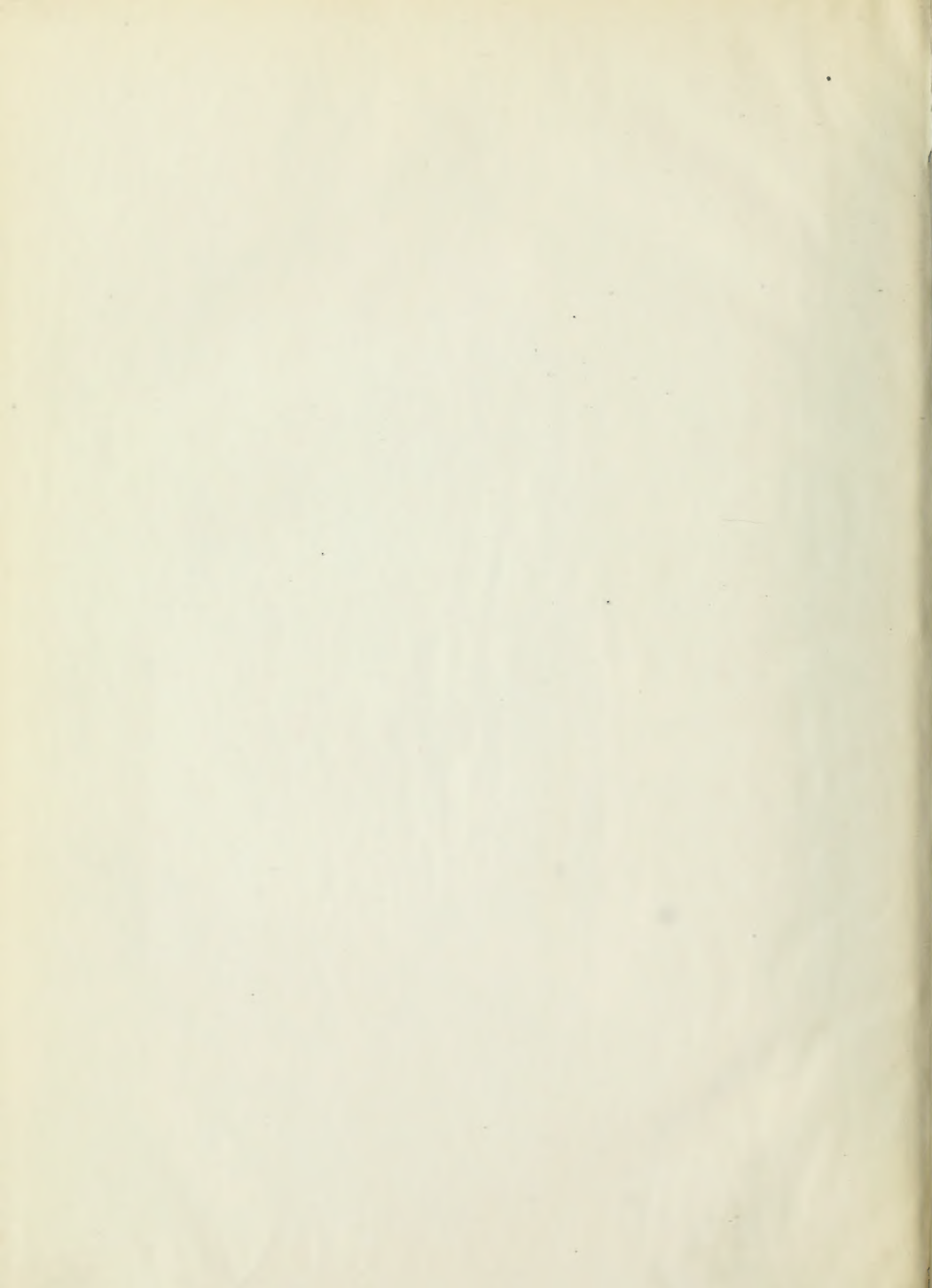
Ventriculography Following the Injection of Air Into the Cerebral Ventricles. WALTER E. DANDY, *Annals of Surgery*, July, 1918.

The outlines of the lateral cerebral ventricles can be sharply demarcated by the x-ray if air is substituted for cerebrospinal fluid. Air has no deleterious effect. The method has proved of practical value in the diagnosis and localization of many intracranial conditions. It is invaluable in internal hydrocephalus.

Preliminary Report of a Method for Estimating in Vivo the Germicidal Activity of Antiseptics. JOSEPH A. PERKINS, *Annals of Surgery*, September, 1918.

The old method of making bacterial counts is not considered reliable in gauging the activity of the antiseptics. It is recommended that cultures be made frequently (every two hours) for obtaining correct impressions.





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